The Scientific Review,

AND

SCIENTIFIC AND LITERARY REVIEW,

A RECORD OF PROGRESS IN ARTS, INDUSTRY, AND MANUFACTURES,

INCORPORATING THE

Journal of the Inventors' Institute.

REGISTERED FOR TRANSMISSION ABROAD.]

Vol. XVI.—No. 11.] NOVEMBER 8, 1881. [Price 6d.

[ALL RIGHTS RESERVED.

SUBJECT MATTER INDEX OF APPLICATIONS FOR PATENTS.

Sept. 21st to Oct. 20th inclusive.

The following Index gives first the class, then the name of the Inventor. In this list (com.) means Invention communicated from abroad. Further information as to the progress of these Patents by Notice to Proceed, Sealing, and Specifying, can be obtained at the Office, 21, Cockspur Street, Charing-cross.

Acids.—E. A. Parnell, J. R. Francis (com.), F. Wirth (com.), J. Deucker, T. Webb, E. Turpin.

Advertising, Advertisements.—F. Mousley.

Air, Gas and Wind Engines, and Mills, Pneumatic Motive Power.—J. Atkinson, R. Watson, C. M. King. C. D. Abel (com.), R. Simon and F. Wertenbruch, C. T. Wordsworth, T. Browett and H. Lindley, A. M. Clark (com.), G. W. Weatherhogg, J. A. Drake and R. Muirhead, J. J. Royle, A. W. L. Reddie (com.), E. Turpin, G. Benier and A. Lamart.

Air, Gases, and Vapours (Pumping, Forcing, Exhausting, Compressing, &c.)—E. P. Alexander (com.), W. H. Akester.

Alkalies (Soda, Potash, Lithia, Ammonia.)—R. H. Davis, W. and H. Marriott, J. Imray (com.), J. B. Kinnear.

Armour Plates.—W. R. Lake (com.)

Asbestos and Amianthus (Treating)- C. J. Allport and A. Hollings.

Asphalte, Bitumen, Tar, Pitch, &c.—B. D. Healey.

Axles, Shafts, Bearings, Journals, Axle Boxes, &c.—G. E. Vaughan (com.). W. L. Wise (com.), G. Wearing, P. M. Justice (com.)

Bands, Belts, Straps, Chains, and Ropes for Driving Machinery, Belt Shippers, &c.—J. Turner and C. McBride, W. H. Steil.

Bark.—W. R. Lake (com.)

Barometers, &c.—J. J. Royle.

Baths, Bathing Appliances.—G. W. Wigner and R. H. Harland.

Batteries, Fortifications, &c.—A. Longsdon (com.)

Belts, Braces, Garters, Girths and Bands for Wear.—W. Steil.

Bleaching, Decolourising, &c.—T. G. Young.

Blowing Engines, Fans, Bellows, &c.—T. M. Roots.

Boilers, Coppers, Kiers, &c.—R. Stone, J. Wadsworth, B. D. Healey, C. Shields.

Bolts, Pins, Studs, Wrist Pins, &c.—J. P. Binns, W. R. Lake (com.)

Books, Albums, Portfolios, Book Covers, Book Cases, Book Slides or Holders, Bookbinding, &c. —W. M. Brown (com.)

Boots, Shoes, Leggings, Clogs, Cleaning Boots, Boot-jacks.—J. H. Ellis, G. R. Alexander, W. H. Stevens, W. R. Lake (com.), L. S. Cohen, H. Ovans.

Boring, Drilling, and Rifling, Gimlets, Augers, Drills, Reamers, Boring Bits, Ratchet and other Braces.—F. B. Dering, A. Upward.

Bottles, Bottle-stoppers, Capsules, Bottling and Decanting Liquids, Stopping and Opening Bottles, &c.—J. Nall, J. W. Nottingham, L. A. Groth (com.), A. M. Davis and H. Des Forges, C. Farrow, A. Michel, H. J. Haddan (com.), H. R. Landon and G. Le Grand, C. Davis and H. Arthy, A. J. Boult, J. Pitt and J. T. Norgrove, B. Azulay, F. H. F. Engel (com.), J. Dollheiser, J. J. Harvey.

Boxes, Cases, Bins, Chests, Trunks.—J. Carter, J. Womersley, E. B. Burr and W. Scott, W. H. Bennett.

Breaks for Machinery, Stop Motions, &c.—W. L. Wise (com.)

Breaks for Railways, Tram Cars, and Road Carriages.—L. Silverman, C. Colwell, G. Westinghouse, W. H. Beck.

Brewing, Treating Malt, and Malt Liquors.—H. A. Bonneville, A. G. Salomon, F. Miller, A. Walker (com.), A. E. Wood, W. R. Lake (com.), G. Cave, T. Webb, A. Manbre.

Bricks, Tiles, and Building Blocks.—C. M. Murray, R. Stone, F. H. F. Engel (com.), S. G. Thomas.

Bridges—Arches, Viaducts, Aqueducts.—E. A. Brydges (com.)

Brushes, Brooms, Mops.—A. Bottin, H. J. Haddan (com.)

Buckets, Pails, Tubs, &c.—T. F. Scott and A. J. Campion.

Building, Flooring and Roofing, Walls, and Ceilings, &c.—W. White, W. Sanders, S. Simpson, J. Carter.

Buttons, Studs, Sleeve Links, and other Dress Fasteners, Eyelets, Button Holes, Solitaires, &c.—P. F. Allen, S. E. Jones.

Canals, Rivers, &c.—G. Hamit, G. Bibbins.

Cans, Canisters, Tins, Drums, &c.—H. J. Haddan (com.)

Cards and Cardcases.—R. Lowe.

Carriages, Cabs, Omnibuses, Waggons, Carts, Trucks, Perambulators, Barrows, Loading, Unloading, and Tipping Carts, &c.—G. Schulz and W. Harrison, J. Rigg, C. H. Brassington, E. Gilbert, J. H. Milas, J. Middleton, G. Scott, F. Joynes, Lord de Blaymere, W. Harrison.

Cartridges, Cases and Holders, Percussion Caps, &c.—R. H. Brandon (com.)

Casks and Barrels, Cask-stands, Vent-pegs, Tilting Casks &c.—W. Smedley, C. Davis and H. S. Arthy, E. J. Heal, W. M. Brown (com.),

Castôrs &c.—D. Mackie and J. C. Jopson.

Casting and Moulding.—J. Gillespie, R. Stone, H. J. Haddan (com.), E. de Pass (com.)

Chenille, and Chenille Fabrics &c.—W. P. Thomeson (com.)

Chains. Chain Cables, Shackles, Links, Swivels, &c.—H. Skerrett.

Cheques, and other Monetary Documents, Cheque-Books, Bank Notes, Forms, Bills, Receipts, Invoices, &c.—J. T. R. Proctor.

Cisterns, Water Tanks, Reservoirs, Vats, &c.—G. G. Cave.

Cleaning and Polishing.—W. Saunders, J. G. C. M. Baronde Lubliaber.

Clocks, Watches, Chronometers and other Timekeepers, Watch Keys, &c.—W. H, Douglas, T. Hughes, H. J. Haddan (com.), H. B. James.

Clutches and Clutch Boxes, &c.—J. Hardrigge, W. L. Wise (com.)

Coating and Covering, &c.—T. S. Webb, H. J. Haddan (com.), W. Griffiths.

Coffee, Cocoa, and Tea; Coffee-pots, Teapots, Urns, &c.—W. R. Lake (com.), J. T. Gondie.

Coins, &c.—G. E. Absell, T. Hughes, J. T. R. Proctor.

Combs, Curry-combs, &c.—H. J. Hsddan (com.)

Condensing Gases, Fumes, and Vapours, Condensers, &c.—A. Chapman.

Confectionery, Pastry, Sweetmeats, &c.—J. L. Collier.

Cooking, and Apparatus used in Cooking, &c. —C. Ezard.

Cork, &c.—E. J. Heal.

Cruet, Liqueur, and similar Frames Condiment Receptacles, Toast Racks, Egg Cups.—J. Muson.

Cutting, Sawing, Planing, and Carving &c.—R. Pemberton, J. H. Smiles, W. G. Tidcombe, D. Peris, J. Westgarth. J. R. Kitson.

Cylinders and Rollers, Covering Cylinders and Rollers.—M. Rust.

Dies, &c.—E. de Pass (com.), W. R. Lake (com,)

Disinfecting, &c.—F. F. Scott and J. W. Campion.

Distilling and Rectifying.—E. T. Beilby, C. Webb, T. Paulmann.

Docks, Basins, &c.—W. R. Kinipple.

Doors, Gates, and Door Furniture.—H. Parsons, J. Hill, B. Spittle, E. Crompton and J. Cochrane.

Draft excluders, &c.—R. W. Newlands.

Drains, Sewers, Gutters, Gratings, Gulleys, Ditches, Traps, Sinks, &c.—F. Dyer, B. Harrington.

Dresses, &c.—J. Warner.

Drying or Desiccating, Expelling Moistures, &c.—G. Tidcombe, J. Worrall, J. Coultas.

Dyes, and Printing Colours, Dyeing and Staining, &c.—R. Nevile, J. Dixon (com.)

Earthenware and Porcelain, Ceramic Wares, Terra-cotta, &c.—J. Gillespie, R. Stone, G. Eyre.

Electricity, Galvanism, and Magnetism, and their Application.—F. E. Falwig, J. Imray (com.), W. P. Thompson (com.), C. A. Barlow (com.), J. Lyon, A. Watt, W. R. Lake (com.), H. Aylesbury, F, Wirth (com.), A. P. Lairric, A, W. L. Reddie (com.), W. O. Callender, G. Pitt (com.), J. F. Sprague, J. W. Swan, C. V. Boys, J. H. Johnson (com.), H. H. Lake (com.), R. Kennedy, P. Jensen (com.), T. M. Newton, E. G. Brewer (com.), A. M. Clark (com.), A. Miller.

Electric Light.—C. Gimingham, J. W. Swau, A. G. Schaeffer, H. J. Haddan (com.), S. G. L. Fox, J. James and J. C. Lee, J. Jamison, R. Harrison, J. Brockie, R. R. Gibbs.

Excavating and Dredging, Embankments.—G. Ally.

Fences, Fencing, Hurdles, Railings, Palings &c.—R. Pemberton.

Fibres (obtaining and treating).—C. J. Allport and J. Hollings, J. and W. McNaught, J. Tatham, J. and T. Bayley, J. C. Mewburn (com.)

Files and Clips, Paper Fasteners.—T. H. Whitehouse.

Filters; Filtering, Purifying, and Clarifying Liquids, Distilling Water, Softening Water.—J. B. Kinnear.

Finishing and Dressing Woven Fabrics, Yarns, and Threads, &c.—J. L. Norton, J. Lodge and N. Oldroyd.

Fire-Arms, Guns, Ordnance, Gun Carriages, Targets, Rifle Practice.—H. H. Lake (com.), R. H, Brandon (com.), L. Gye.

Fire-Engines, &c.—E. Leonard, J. Dutton, J. Onions and W. H. Tooth.

Fire-Places, Stoves and Ranges, Fenders and Fire-Irons, Fire-Guards, &c.—W. P. Thompson (com.), G. E. Wolff, G. J. Cox, J. McMillan, J. Wadsworth, F. Fletcher, P. Everett and A. Barnard, W. A. Martin, W. A. Barlow (com.), T. E. Clarke.

Flues and Chimneys, &c.—G. Wainwright, B. D. Healey, G. Fox, F. Wirth (com.)

Food for Animals, &c.—E. Wylam, J. H. Cox.

Fishing, Fishing Tackle.—G. Burt.

Fuel (Artificial), Fire-lighters, &c.—A. G. Elliott.

Furnaces and Fire-boxes, Supplying Furnaces with Fuel.—L. Shaw and P. T. Fletcher, W. Ireland, C. W. King, R. Stone, J. McMillan, G

Eyre, J. Shepherd, J. Hardinge, T. Hudson, J. W. Chenhall, W. Black and T. Larkin, H. H. Lake (com.)

FURNITURE, Bedsteads, Tables, Cabinets, Chairs, Desks, Wardrobes, Upholstery, Cabinet-work, &c.—J. Gilbert, H. E. Newton (com.), J. Middleton and G. Scott, M. A. Dearden.

GAMES and Exercises, Billiards and Bagatelle Markers and Indicators for Games, Gymnastic Apparatus.—A. Hodgkinson, A. Kay, A. W. Turner, H. Bartlett.

GAS (Making), &c.—L. T. Wright, E. P. Alexander (com.), C. D. Abel (com.), W. R. Lake (com.), E. Hagen (com.)

GAS and other Burners.—T. W. Stokes, B. Scwarz, T. R. Huppertsberg.

GLASS (Making and Treating) and its Applications.—A. Cowan, J. Sowerby, J. G. Savage.

GOFFERING, &c.—J. Dowling.

GOVERNORS for Engines and Machinery.—W. P. Thompson (com.), J. H. Johnson (com.), P. Turner.

GRAIN and Seeds (Treating, &c.)—J, Coultas, A. Manbre.

GREENHOUSES, Hothouses, Conservatories, Forcing Pits, and Frames.—T. Stokes.

GRINDING, Crushing, and Disintegrating Corn, Grain and Seeds, and Dressing Flour.—W. P. Savage, H. J. Haddan (com.), W. R. Lake (com.) F. Stansfield, A. Besser.

GRINDING, Crushing, Pulverising and Disintegrating Miscellaneous Substances.—A. J. Struthers R. Davis.

HANDLES, &c.—C. Eyart.

HARBOURS, Piers, &c.—E. A. Brydges (com.), W. R. Knipple.

HAIRDRESSING, Shaving, Pomades, &c.—A. M. Clark (com.), H. J. Haddan (com.)

HAMMERS &c.—S. Fox.

HARNESS, Saddles, Curbs, Whips, Releasing from Harness, Grooming Horses, Nosebags.—J. E. Purdon, R. Spence.

HATS.—W. R. Lake (com.), A. Wilkinsou.

HAY.—G. W. Swarbrick.

HEATING, Warming, and Evaporating, Obtaining and Regulating Heat, &c.—J. Challender, A. Chapman, W. Truswell, G. H. Ellis, W. R Lake (com.), G. W. Wymer and R. H. Harland, J. F. Goldie, J. Wadsworth, W. R. Lake (com.), E. Tellin, W. R. Dewhurst, and G. Barker, J. T. Sprague, W. A. Barlow (com.)

HOISTS, Jacks, Lifts, Winches, Cranes, Capstans, Windlasses, Raising, Lowering and Moving Heavy Bodies, Raising from Mines.—G. Allix, C. R. Parkes, E. Latham, M. T. Medway.

HOOPS, Rings, &c.—W. M. Brown (com.), S. Fox.

HOPS.—A. Walker (com.)

HORSE Shoes, Shoeing Horses, Shoes for Animals, &c.—W. Reynolds J. Welsby.

INDIARUBBER, &c.—H. J. Haddan (com.)

INSULATING, &c.—J. Lyon, W. Callender, S. Pitt, A. Gilbert.

IRON (Salts and Oxides).—E. A. Parnell.

JARS, Jam Pots, &c.—H. R. Landon and G. Le Grand.

JEWELLERY, &c.—T. Hughes, E. J. Jones, E. Richardson.

KETTLES.—W. B. Dewhurst and G. Barker.

KNITTING, Looped Fabrics, Tatting, Crocheting, &c.—W. H. McNary, W. R. Lake (com.), H. J. Haddan (com.), S. Fingland, T. Thorpe, W. Dexter.

KNIVES, Forks, Table Cutlery, Knife Cleaners. &c.—L. A Groth (com.), L. Meyer (com.)

LAMPS, Lanterns, Chandeliers, Gaseliers, Lamd Furniture. Lighting and Extinguishing Lamps, Artificial Light, Producing Light, Candlesticks, Candelabra, &c.—J. E. Leeson. J. Wilby, F. W. S. Stokes, A. Aron (com.), B. Scwarz and R. Huppertsverg, A. W. Calvert, A. W. Calvert, J. A. B. Bennett, J. Herd and B. P. Walker, E. Turpin, A. M. Clark, (com.), T. Smith, R. H. Courtenay, T. C. Kinnear.

LATHS, &c.—A. M. Ross.

LAVATORIES, Washing Basins, &c.—J. N. Maskelyne, G. Nobes.

LEATHER, Treating Hides and Skins, Parchment, Currying, Tanning, Cutting, and Ornamenting Leather.—J. W. Janson, H. J. Haddan (com.), D. Galbraith.

LIFE-BUOYS, &c.—W. R. Lake (com.)

LIGHT-HOUSES, &c.—E. Turpin.

LOCKS Latches, Bolts, Lock Furniture, Keys. —J. Hill, E. de Pass (com.), B. W. Spittle, C. Gall, H. Skerrett.

LOOKING Glasses, Mirrors.—E. W. Elmslie.

MAGNESIUM, &c.—F. Wirth (com.), T. Twyman.

MANGLES, &c.—H. J. Haddan (com.)

MANURE ; Treating Sewage.—A. G. Salomon, P. Spence, J. Hanson, W. H. Marriott, J. B. Kinnear.

MATCHES, Fuzees, Pipe and Cigar Lights, &c. —E. Turpin.

MATHEMATICAL, Surveying, and Astronomical Instruments.—G. Stephens and Hivilmer.

MEASURES, Measuring, &c.—J. Hardinge, W. Clark (com.)

MEDALS, &c.—T. Hughes, E. de Pass (com.)

METAL Waste.—W. R. Lake (com.)

METALS (Casting, Moulding, &c.)—L. E. Thomas.

METALS (Coating, &c.)—T. S. Webb, C. J. Davidson, H. J. Haddan (com.), W. O. Callender, H. H. Lake (com.)

METALS; Cutting, &c.—J. Pemberton, J. H. Smiles, J. Westgarth, T. H. Whitehouse, J. H. Kitson.

METALS (Forging, &c.)—R. Armitage and T. Gillott, T. Titley, J. Hardinge, J. Westgarth, W. R. Lake (com.), E. Dearden, S. Fox, W. H. Carmont.

METALS (Smelting, &c.)—A. Getchell, R. Stone, W. R. Lake (com.), J. R. Francis (com.), J. Lloyd, S. G. Thomas, A. L. Holley, Mackenzie, J. W. Chenhall, W. Black and T. Larkin, H. H Lake (com.), P. Jensen (com.)

METERS, &c.—W. Richards, A. Aron (com.), A. Wightman.

MIXING, Kneading, Mashing, Stirring, Agitating, &c.—F. Miller, H. J. Haddan (com.)

MINING, Boring and Blasting Rock, Raising from Mines, Getting Coals, Draining, Lighting, and Ventilating Mines.—J. D. Brunton, R. Hadfield.

MOTIVE-POWER Machines, Obtaining Motive power.—E. Edwards (com.), W. L. Wise (com.) A. W. L. Reddie (com.)

MUSIC, &c.—H. Sprungman, J. J. Gilbert.

NAILS, Spikes, Bolts, Rivets, Screws, &c.—J. Hardinge, W. R. Lake (com.)

NEEDLES, &c.—A. W. L. Reddie (com.), J. Millward, W. R. Lake (com.)

NOXIOUS GASES (Preventing) &c.—B. D. Healey.

NUTS and Washers.—J. P. Binns, C. E. Challis.

OILING or Lubricating, &c.—J. W. Lowther (com.), C. D. Abel (com.), S. Pitt (com.), J. J. Royle, J. Gallie, P. M. Justice (com.)

OILS, Fatty Matters, Grease.—J. T. Beilby, C. D. Abel (com.), W. R. Lake (com.), J. Deucher.

OPTICAL Instruments, Optical Illusions, &c.—W. Brookes, N. Lazarus, P. Adie.

ORNAMENTING, &c.—A. N. Hopkins and G. Hatton, W. H. Beck (com.), G. N. Savage.

OVENS and Kilns.—G. Eyre.

PAINTS, Colours, Varnishes, &c.—E. A, Parnell, J. Storer.

PANELS.—W. H. Beck.

PAPER Pasteboard, Papier Mache Paper Hangings.—W. C. Horne, H. Olrick (com.), G. Tidcombe, W. Conquest (com.)

PARCHMENT, &c.—H. J. Haddan (com.)

PENS, Penholders, Pencils, Pencil Cases, &c.—F. Wirth (com.)

PHOTOGRAPHY and Photographic Apparatus. Pictures, Portraits, &c.—W. Brooks, A. Cowan, C. Sands, R. Lowe, E. de Pass (com.)

PIPES, Tubes, and Syphons : Joining Pipes.—R. Armitage and T. Gillott, H. J. Haddan (com.), F. des Voeux, A. Upward, E. G. Mawbey, S. Fox.

PRESERVING Food, &c.—G. J. Digby, W. White, J. Sturgeon and J. W. V. Galway.

PRESERVING Miscellaneous Substances.—G. W. F. Swarbrick.

PRESSES, Compressing, &c.—H. Springman, (com.), H. E. Newton (com.)

PRINTING and Transferring: Type and other Surfaces for Printing, Composing, and Distributing Type.—H. H. Lake (com.), J. W. Stringer, W. R. Lake (com.), H. J. Haddan (com.), H. Jullien, W. Conquest, R. H. Neville.

PROPELLING Machinery, Transmitting Power and Motion, Converting Movements.—J. R. Purssell, J. Harding, H. H. Lake (com.)

PROPELLING Ships, Propellers, Paddle-wheels and Screws.—J. Simpson, J. Jones, W. R. Kimpple, J. Carr, M. Heincke. W. R. Lake (com.)

PULLEYS.—C. F. Brodie, A. Goodwin, J. Pitt (com.)

PUMPS, Pumping and Forcing Liquids, Pumping and Raising Water and other Liquids, Pumps, Pistons, and Packing.—F. P. E. J. and J. T. Preston, E. W. de Rusett and J. A. Fowler, J. W. Rainbow, F. M. Roots, R. Stone, H. J. Haddan (com.), J. W. Lowther (com.), A. M. Clark (com.), S. Lees and T. Albion, W. Hakester, J. Gill, S. Groth.

RAILWAYS, Carriages, Coupling, Uncoupling, and Altering Positions of Carriage and Engines.—C. Corwell, J. Jackson and T. Ballantyne, F. des Voeux, E. Gilbert and D. Sinclair.

RAILWAY, Permanent Way, Rail Joints, Chair and Sleepers, Portable Railways, Atmospheric Railways, Switches, Points, Crossings, and Turn-tables.—H. Aron, A. M. Clark (com.)

REAPING and Mowing, &c.—J. Howard and E. F. Bousfield.

REFLECTORS, &c.—F. and F. A. Hamilton.

REFRIGERATING and Freezing, Cooling Liquids Making Ices, &c.—J. Court, J. Chambers.

REGISTERING, &c.—J. N. Maskelyne, V. Milward, H. Smith, J. Proctor, D. Young, A. Budenberg (com.), H. T. Bartlett, J. J. Royle, F. H. F. Engel (com.), W. P. Thompsou (com.)

ROPES, Cords, &c.—C. H. Kennell, W. Griffiths, J. Turner and C. McBride.

SCREWS, Screw Drivers, &c.—J. P. Binns, W. R. Lake (com.)

SCULPTURE &c,—E. de Pass.

SEWING and Embroidering.—J. Renals (com.), F. Catlan, H. Simon (com.), H. E. Newton (com.), H. H. Lake (com.), M. H. Pearson.

SHEARS, &c.—P. Peres.

SHIPS and Boats, &c.—J. Simpson, A. Longsdon, W. R. Lake (com.), S. Pitt (com.), H. Goatley, E. Crompton and J. T. Cochrane, W. R. Lake (com.)

SHIPS' Boats.—J. A. Timmis, A. Simey.

SHIPS' Cargoes (Loading, &c.)—H. Verdi, J. Rigg.

SHIPS' Rigging, Sails, &c.—W. Griffiths.

SHOT, Shell, Bullets, Cartridges, Percussion Caps, &c.—H. Simon (com.), E. Turpin.

SIFTING, Sorting, and Separating.—A. G. Fraser, G. Smith and L. W. Harvey, T. Stansfield, A. Besser.

SIGNALS &c.—W. P. Thompson (com.), J. Norris, H. Aron. B. J. B. Mills (com.), F. W. Durham, H. Cuthbert and G. H. Smith, C. D. Abel (com.), E. Turpin.

SLUICES, &c.—J. M. Bibbins (com.)

SOAP.—H. W. Blease and T. T. Wilson.

SOUNDINGS, &c.—J. Schwartz.

SPADES, &c.—T. Tiltey.

SPINDLES and Flyers.—T. Thompson and J. W. Naylor.

SPINNING, &c.—H. J. Haddan (com.), J. Sellers, R. Spondler (com.), J. Harrison, J. Bastew, T. H. Blamires, J. Beard, J. Tatham, J. and T. Bayley, J. and A. Leadbeater, T. Briggs, W. Terry and J. Scott, R. Scarfe, F. W. Borland, J. C. Mewburn (com.), C. Pieper (com.)

SPOONS, &c.—L. A. Groth (com.)

SPRINGS.—J. Walters, F. Joynes.

STEAM and other Boilers, Cleaning and Preventing Incrustation of Boilers, Water Feeding Apparatus for Boilers.—C. D. Abel (com.), C. W. King, R. Stone, A. C. Henderson (com.), H. J. Haddan (com.), R. Armitage and T. Gillott, G. W. Wymir and J. Dixon, G. Wainwright, J. L. Rastrick.

STEAM Engines (Stationary, Locomotive, and Marine.)—H. Swift, C. D. Abel (com.), W. Wilkinson, A. Wightman, A. Budenberg.

STONE, &c.—W. A. Barlow (com.)

SUGAR and Syrups, Glucose.—H. Chapman, W. R. Lake (com.), A. Manbri (com.), C. Pieper (com.)

SURGERY, &c.—W. Reynolds.

SULPHUR.—W. Black and T. Larkin.

TARPAULINS, &c.—E. Gilbert and D. Sinclair.

TEACHING.—W. A. Barlow (com.)

TELEGRAPHS ; Telegraph Printing Apparatus.—E. G. Brewer (com.), E. de Pass (com.), C. D. Abel (com.), W. O. Callender (com.), S. Pitt (com.), A. R. Bennett, J. Imray (com.)

TESTING Strength, &c.—E. Jones, J. Watson (com.)

THERMOMETERS, Barometers, Pyrometers, &c.—E. A. Brydges (com.)

THRASHING Machines, Reaping Machines.—R. Moore and J. Lee.

TILLING and Cultivating, &c.—J. Anderson, A. M. Clark (com.)

THREADS and Yarns.—F. A. Gatty.

TOBACCO and Snuff, Cigars, Cigar-Holders. Pipe and Cigar-lighters, Smoking Pipes, Tobacco Pouches, &c.—E. B. Burr and W. T. Scott, H. L. Friedlander, D. T. Powell.

TORPEDOS.—P. Brotherhood.

TRAMWAYS and Tramway Carriages, Tramway Locomotives.—W. Wilkinson, F. de Voeux (com.), A. M. Clark (com.)

TRAPS for Animals, &c.—G. Gates.

Trimmings, &c.—L. A. Walters and A. George, M. A. Dearden.

Trowles.—T. Tyzack.

Tunnels.—J. D. Brunton, F. B. Dering, J. Onions and W. H. Tooth.

Umbrellas, Parasols, &c.—H. A. Davis, J. Miniere, T. W. Haddan, W. P. Thompson (com.),

Upholstery, &c.—J. F. Wanner, M. F. Rust, W. Horne, M. A. Dearden.

Urinals, &c.—G. Nobes, W. F. McCormick.

Valves, Taps, Stop Cocks, Plugs; Regulating the Flow and Pressure of Fluids.—F. Dyer, H. Hughes, J. Thompson, A. C. Henderson (com.), J. G. Stevenson, A. Upward, C. Shields, J. A. and J. Hopkinson.

Velocipedes.—J. F. Walters, C. Schulz and W. Harrison, J. T. Surridge, J. Warwick, J. Lamplough, A. Phillips, J. S. Edge, T. Harrison, A. M. Clark (com.), W. Harrison, F. W. Eicke, S. Hall, G. Singer.

Ventilation: Supplying and Purifying Air for Buildings, Mines, Ships, Carriages, &c.—A. Bedborough, J. H. Johnson (com.), E. P. Alexander (com), J. Onion and W. Tooth, B. R. Harrington, W. A. Barlow (com.)

Washing, Cleansing, and Wringing Fabrics, Yarns, and Materials.—T. W, Walker, J. and W. McNaught, H. J. Haddan (com.)

Water-Closets, &c.—J. L. Maskelyne, W. A. McCornish, G. L. Waring, J. Hornby, G. Pitt.

Water-power, &c.—A. Wightman, W. L. Wise (com.), J. Webster.

Waterproofing, &c.—W. White, W. Callender, J. H. Johnson (com.), T. Woodward.

Wearing Apparel, &c.—J. Wanner, F. McSevenna, H. J. Haddan (com.)

Weaving, Braiding, Plaiting, Preparing for Weaving.—T. Bottomley, W. Ashworth, J. Leeming, G. Kirk, J. Riley, J. Barbour.

Weighing, &c.—T. Moore, T. Williams.

Wheels for Machinery, &c.—C. F. Brodie, A. A. Goodwin, G. Pitt.

Windows.—A. Bedborough, H. Skirritt, F. and H. Hamilton, H. Parsons, C. Hook, J. Carter, C. Gail, J. Cullingworth.

Wire, Wire Working, &c.—J. Westgarth.

Yeast, &c.—J. Roper.

⁂ *The above List is prepared from the Patent Records by Mr. T. Morgan, Secretary of the Inventors' Patentright Association, Limited.*

THE ROOT OF THE COTTON PLANT.

The value of the cotton plant (Gossypium herbaceum) has been increased by the discovery that the bark of the roots yield a promising dyestuff. Mr. W. C. Staehl reports that when the bark of cotton root is exhausted by alcohol of the specific gravity of 0·84, a dark reddish-brown liquid is obtained, which, when distilled to recover the spirit, leaves a resinous matter which amounts to 8 per cent. of the original weight of the bark. The new product thus obtained appears black and shining, but when pulverised takes the colour of cochineal. It dissolves in 14 parts of alcohol, 15 parts of chloroform, and 122 parts of benzol. It dissolves also in caustic alkalies, and is precipitated from these solutions by acids. Hydrate of potash colours green. Sulphuric acid dissolves it with a red-brown colour.—*Scientific American.*

The Postal Business of the World.—A German paper has been compiling the statistics of the world's correspondence by post and by telegraph. The latest returns which approached completeness were for the year 1877, in which more than 4,000,000,000 letters were sent, which gives an average of 11,000,000 a day, or 127 a second. Europe contributed 3,036,000,000 letters to this great mass of correspondence; America, about 760,000,000; Asia. 150,000,000; Africa, 25,000,000; and Australia, 50,000,000. Assuming that the population of the globe was between 1,300,000,000 and 1,400,000,000, this would give an average of 3 letters per head for the entire human race. There were in the same year 38,000 telegraph stations, and the number of messages may be set down for the year at between 110,000,000 and 111,000,000, being an average of more than 305,000 messages per day, 12,671 per hour, and nearly 212 per minute.

Reviews.

JAGO'S INORGANIC CHEMISTRY.

"Inorganic Chemistry, Theoretical and Practical; an Elementary Text-book, designed primarily for Students of Science Classes connected with the Science and Art Department of the Committee of Council on Education." By William Jago, F.C.S., Assoc. Inst. Chem., First Class Honours Certificated Teacher in Chemistry, Head Science Master of the Brighton School of Science and Art, Science Master at the Brighton College, &c. London: Longmans, Green, & Co. 1881.

Although we have before expressed opinion on the subject of the Text-books having especial reference to the Science and Art Department, or rather its syllabus, yet we cannot withhold notice of this work. According to the author the teacher of classes in connection with the Science and Art Department has to face special difficulties. In addition to his desire to give his students a thorough knowledge of their subject, and particularly those portions which have a special application to the industries in which they are engaged, he must necessarily remember that it is all-important to him that good results be obtained at the Department's examinations, and the author of this book seems to think that he encounters the same difficulty. His contention that the Science and Art Examination in Chemistry is unanimously conceded to be a fair one may be open to question, but we must concede the Department have done a great deal, yet not so much as in our opinion was expected. We think the work is up to the standard of those previously issued for the like purpose, and it may be recommended to students who are desirous of passing their examination under the Science and Art Department.

BELL'S ANALYSIS AND ADULTERATION OF FOODS.

"The Analysis and Adulteration of Foods." By James Bell, Principal of the Somerset House Laboratory, Vice-President of the Institute of Chemistry, &c. Part I: Tea, Coffee, Cocoa, Sugar, &c. Published for the Committee of Council on Education by Chapman and Hall, Limited, 11, Henrietta Street, Covent Garden. 1881.

According to the preface this work is intended partly as an aid to those who may desire to carefully examine the illustrations of Food Adulteration in the Bethnal Green Branch of the South Kensington Museum, and partly as a contribution to the already published knowledge of the composition and analysis of articles of Food.

The analyses, with the exception of those under the head of Coffee, which were made for the Inland Revenue Department in 1852, are almost entirely new, and have been made with great care for departmental purposes.

It is intended that this work shall be followed by Parts II. and III., which will treat of the analysis and composition of other foods.

It can scarcely be expected that a work like this, prepared amidst the labours of an important Government department, will be found entirely free from errors, but it is hoped that these are not numerous.

This work is well worth attention by all interested in Analysis of Food and also its Adulteration.

Mr. George H. Hutton, of Baltimore, Md., has patented an improved *jump seat* for carriages, in which the seat is supported by legs hinged to the seat and body, and provided with a removable and reversible stop, having bifurcations on its upper and lower faces.

FOREIGN PATENT LAWS.

AUSTRIA-HUNGARY.

In the laws of Austria-Hungary inventions are classed under three heads, and defined as follows:—

1. *Discoveries, i.e.*, the introduction of the methods of production hitherto unknown in the country, and the resuscitation of methods once known but now forgotten and lost.

2. *Inventions, i.e.*, the creation of a new object by new means; or a new object by means already known; and of a known object by other means than those used for its production.

3. *Ameliorations, i.e.*, any addition to an existing invention which improves the quality or reduces the price of the product of such invention.

Each of these classes of inventions is considered new, provided it is unknown in the Empire either in practice or in a printed book or document accessible to the public.

All inventions must have for their object either—(*a.*) A new industrial production; (*b.*) a new means of production; (*c.*) a new method of production. Patents are granted to inventors irrespective of their nationality. Patents are not granted for alimentary preparations, beverages, or medicine, nor for those which cannot be used without injury to the interests of the State, the public health, morality, and safety. A foreign invention can only be patented in Austria-Hungary on condition that it is still patented abroad; and is granted only to the foreign patentee or the possessor of his rights in it. Scientific principles, unless the latter are actually brought to bear upon production, cannot be patented.

Applications for patents must be addressed to the competent authorities, district or provincial governors, accompanied by the requisite fee, or a certificate of the deposit of the same, and by a sealed description of the invention, as well as by models and draw ings, if necessary. Applications are made by inventor or his duly accredited agent, and state the full name, profession, and domicile of the applicant, and if living abroad that of his agent in the Empire. If the invention is to be used by others than the inventor, their names, domicile, and profession must likewise be stated; the title of the invention; the number of years for which the patent is demanded, which cannot exceed fifteen without the special imperial authority; or, if the invention is already patented abroad; whether or not secresy is desired.

The taxes on patents are proportional to the term of years. On receipt of an application the district authorities, after seeing that it is properly drawn up and signed, and accompanied by the proper enclosures, and that provision has been made for the payment of the tax, marks on the envelope the day and hour of its presentation, and various formalities are then taken by the provincial governor to whom application is forwarded. A patent secures to the patentee the exclusive use of his invention for the number of years mentioned in the application, and he can take all requisite measures for working his invention and selling its products, and to empower others to work it for him. He may dispose of his patent as he likes, by sale, testament, lease, &c., and obtain foreign patents for his invention. Patentees can procure for one or more years the renewal of patents originally granted for less than fifteen years by making the application to that effect.

Patents are invalid and cancelled:—(*a.*) When all the legal requirements have not been complied with in obtaining them. (*b.*) On proof being given that the invention in question was not new at the time at which the patent was issued; or that it was introduced from abroad without the consent of the foreign patentees. (*c.*) On proof being given by a patentee that the invention is identical with one for which a patent ha already been granted. (*d.*) As being injurious to the public interests.

Patents lapse:—(*a.*) When the patentee fails to make use of his patent for one year from the date of its issue, or later, allows two consecutive years to elapse without working his invention. (*b.*) On the expiration of the term for which the patent was granted or renewed. (*c.*) In consequence of a voluntary renunciation of the rights conferred by a patent.

If any encroachment is made on a patented invention same is punishable by fine, and should a patentee whose rights have been encroached upon be unwilling to prosecute, he may apply for a rule prohibiting further counterfaction or sale, and ordering the exportation of imported counterfeits.

In all actions relative to patents the original description of the invention given by the patentee is the sole evidence of its nature.

PATERSON ON UTILIZING MUSICAL INSTRUMENTS.

THIS invention consists in arrangements by which the action of a pianoforte, organ, or other keyed instrument produces, when played upon, such an action on a mechanism combined with it that a musical composition once played upon it may at any time be repeated by automatic machinery set in motion by any motive powers (such as manual labour as turning a handle, or clockwork wound up previously and released when required, or by electric motors or steam engines).

When applied to a musical instrument it does not interfere with the ordinary mechanism, so that when not in use the ordinary action of the instrument is intact, and it may be used in the usual way. And when the invention is in use, *i. e.*, when a composition is being played with the intention of producing the means of repeating it at will without the trouble of playing it over, the usual action of the instrument can go on or not at the will of the performer, at the same time as the extraordinary action.

Taking, for example, when applied to a pianoforte, under the keyboard is arranged a web band or membrane of any suitable material (such as paper, leather, cloth, or metal), which is stretched on and passes over rollers driven by any suitable means such as would give a uniform rate of movement to the web. When the keys are depressed in the act of playing, a pin either fixed to the underside of the key or sustained at a suitable height above the web by a spring, is forced through the web and perforates it, and as the web is kept moving and the playing goes on, a series of perforations are produced corresponding to the musical sounds. When the piece is finished and it is required to reproduce the same from the perforations, it can be effected in the following manner:—On a bar or rod I arrange contact pieces insulated from one another, one or more to each key, and in front of same is a conducting bar between which and the contact pieces the web (which in this form of the invention is non-conducting), is caused to travel, and as each hole comes opposite the contact pieces contact is formed.

ON DROPS FLOATING ON THE SURFACE OF WATER.

By Professor OSBORNE REYNOLDS, F.R.S.

THE following paper was read at a recent meeting of the Manchester Literary and Philosophical Society:—

It is well known that under certain circumstances drops of water may be seen floating on the surface for some seconds before they disappear. Sometimes during a shower of rain these drops are seen on the surface of a pond; they are also often seen at the bows of a boat when travelling sufficiently fast to throw up a spray. Attempts have been made to explain this phenomenon, but I am not aware of any experiments to determine the circumstances under which these drops are suspended. Having been deeply engaged in the experimental study of the phenomena of the surface tension of the water and the effect of the scum formed by oil or other substances, it occurred to me that the comparative rarity of these floating drops would be explained if it could be shown that they required a pure surface, a surface free from scum of any kind. For, owing to the high surface tension of pure water, its surface is rarely free from scum. The surface of stagnant water is practically never free except when the scum is driven off by wind. But almost any disturbance in the water, such as the motion of the point of a stick round and round in the water, or water splashed on the surface, will serve to drive back the scum for a certain distance. This may be shown by scattering some flowers of sulphur on the surface. This powder is insoluble and produces no scum, and hence it serves admirably to show the motion of the surface and whatever scum there may be upon it. If, when the surface is so dusted, a splash be made by a stick so as to throw drops on the sulphured face, at the first splash no floating drops are produced; but after two or three splashes in rapid succession it will be seen that the sulphured scum has been driven back by the falling water, leaving a patch of clear surface, and on this drops will float in large numbers and of all sizes. These drops are entirely confined to that portion of the surface which is clear. The drops, either by their initial motion or by the current of air, glide rapidly over the surface from the point at which they are formed. When, however, they reach the edge of the scum they disappear, apparently somewhat gradually. I have this summer made the experiment on several ponds and on various days, and I have never found any difference. Any scum, however transparent, prevented the drops, and they always floated in large numbers when the scum was driven back in the manner described, by the wind or any other way.

This result points to the conclusion that whatever may be the cause of this suspension, it depends only on the surface of the water being pure, and not at all on the temperature or condition of the air.

RECENT AMERICAN AND FOREIGN PATENTS.

Nails and Rivets.—Mr. John Hyslop, Jr., of Abington, Mass., has patented an improved method of trimming heads of nails and rivets. In the manufacture of tacks, nails, and rivets, they come from the machine with a fin around their heads, making the heads irregular in shape and size. Heretofore this fin has been removed either by placing them in a revolving drum or by forcing them through a die head foremost. The object of this invention is to permit tacks, nails, and rivets, with heads of any size or configuration, to be trimmed to give their heads the same size and shape, and to permit of their being fed automatically to the die from the nail machine.

Injector for steam boilers has been patented by Mr. John M. Holt, of Greensborough, N. C. The object of this invention is to provide a convenient means of indicating instantly to the eye or ear the condition of the injector when in operation, and at the same time to utilize the water that escapes at the waste pipe of the injector for washing out the ash pan of the furnace.

Water wheels.—Mr. Calvin Dilks, of Alloways-town, N. J., has patented an improvement in horizontal water wheels of that form in which the water is admitted to the periphery of the wheel through lateral guides or chutes, and after striking the wheel is discharged therefrom centrally, downwardly, and upwardly. The improvement consists in the peculiar construction and arrangement of the buckets in the wheel, and in the arrangement of the wheel in the case for permitting its easy removal.

An improved ditching machine has been patented by Mr. Samuel C. Robinson, of Pemberton, O. This invention relates to that class of ditching machines intended to excavate a ditch for the reception of tile in its bottom; it consists of a wheel capable of being raised and lowered, and provided on its circumference with a series of curved spades for excavating the earth to form a ditch as the wheel revolves, which earth is carried up a circular chute concentric with the wheel by the curved spades, and discharged on the ground outside of the ditch by a quick semi-rotary motion of the axis of each spade.

An improved *magnetic wheat cleaner* has been patented by Messrs. Thomas J. Delany and John B. Morgan, of Kansas City, Mo. It consists of a grain spout having side openings and pivoted cylinders projecting into said spout, and having magnetic as well as non-magnetic surfaces.

Bracelet.—Mr. Shubael Cottle, of New York city, has patented an improved form of bracelet of that general construction in which several tubular parts with swiveling joints are combined with a torsional spring arranged within it, whose tension serves to hold the sections of the bracelet in an elliptical form, but allows them to be opened by a lateral movement for the insertion of the wrist.

An improved *jacket for cans* has been patented by Mr. Charles R. Peaslee, of Louisville, Ky. The object of this invention is to provide a sectional jacket for a can, which is so secured thereto that the can is free to move within the same, whereby it may yield in case of sudden twist to prevent breakage.

An improved *earth scraper* has been patented by Mr. John Hale, of Sidney, O. This scraper is formed of a scoop bent from a single plate of iron or steel, and provided with handles, clasps, and bent rod.

Sulky Plough.—Mr. Sam T. Ferguson, of Minneapolis, Minu. has patented a sulky plough which is an improvement upon the sulky plough for which Letters Patent were granted to the same inventor February 5. 1878. In that patent the plough was swung from a bail which had an elbow extension, which latter was connected by a link with the lower end of a hand lever that was operated by the driver to raise or lower the plough. The present invention consists in connecting the link to the bail by an elbow extension which has a screw connection with the link, so that the point of connection between the link and this elbow extension may be thrown closer to the centre of oscillation of the bail, or further from it, so as to regulate the depth which the plough goes into the ground.

An improved storm rudder.—Mr. Charles O. Nyqvist, of Brooklyn, N.Y., has patented an improved storm rudder which enables seamen to readily control their vessels should the rudder become unshipped or disabled in a storm. The invention consists in placing rudders on the sides of vessels, and in arranging suitable mechanism for operating the rudders, whereby the vessel can be guided and controlled should the ordinary rudder become disabled.

An improved *car coupling* has been patented by Mr. George Holforty, of Sedgwick, Kan. The invention consists of a vertically sliding spring-actuated connecting bolt which engages with the head of the connecting link upon three sides, the bolt being adapted to move in ways formed in the drawhead.

Combined Fork and Rake.—Mr. George S. Latta, of Berea, N. C., has patented an improved combination fork and rake, which can be readily adjusted for use in either capacity. The invention consists in constructing a combination fork and rake with a handle having sockets or keepers attached to its end, a head having a shank, a jointed brace hinged to the shank, and having a shoulder upon its rear part, the locking bar having a corresponding shoulder, and a screw band for clamping the various parts of the implement together, whereby the implement can be readily adjusted as a fork or a rake.

Lubricator.—Mr. Francis A. De Bremon, of Clifton, N.J., has patented a new and improved device for furnishing a continual supply of lubricating substance to the shaft or axle of a wheel. The invention consists in a box containing the lubricant, and provided with a follower and a spring for pressing this lubricant to the inner end of the box, from where it flows to the axle through a tube and along a wire contained in this tube and pressed against the axle by a spiral spring, whereby the axle is furnished with a constant supply of the lubricant.

Heat Alarm.—Mr. James Curran, of New York city, has patented an improved heat alarm for signalling changes of temperature with an expansion rod to be inserted in the heated tank or chamber, a compound lever for multiplying the changes in length of the expansion rod, a connecting rod, and a steam valve and whistle connected with the heating pipe, whereby changes in length of the expansion rod will open the steam valve and cause the whistle to give a signal.

Coiling Machine.—Mr. Oscar Bihet, of Liege, Belgium, has patented an improved machine for coiling a band or rod of metal into the shape of a helix or volute spring. The invention consists in a machine provided with a helical mandrel mounted on a suitable shaft, and provided with a detachable hook for seizing the bar or rod of which the spring is made, immediately after the same leaves the furnace, which bar or rod passes over and between suitable guards, and is pressed upon the mandrel by a flanged roller loosely mounted on a shaft journaled in the ends of a fork attached to a vertical shaft, that is forced downward by a spring surrounding it, and is provided with a screw passing through a hand wheel, by the rotation of which the the flanged roller may be raised.

An improved fastening or locking device, especially designed to endure without injury the excessive strains that trunk locks are subject to, has been patented by Mr. David W. Eggleston, of Terryville, Conn. The invention consists of a laterally swinging unjointed hasp, designed to be pivoted on the body of the trunk, having a large opening in its free end that sets over and coincides with a socketed and perforated nose or lock plate which is designed to be fixed on the trunk cover.

An improved electric lock has been patented by Messrs. William R. Manniere and Henry B. Porter, of Chicago, Ill. The object of this invention is to provide an electrical attachment for locks, which will indicate at once the surreptitious opening of the lock by other means than the key.

A Cheap and Efficient Solar Camera.—Mr. Heinrich A. W. Braune, of Memphis, Mo., has patented a cheap and efficient solar camera, which is light and portable, and may be readily taken apart or set up, as required. Any ordinary tube may be used in the instrument, and no extra tubes are required. The print being detached from the camera box, the printing may be watched and the light regulated according to the shades desired. The instrument may be readily handled and managed by one person.

Can Opener.—Mr. William Weiss, of New Orleans, La., has patented an improved and simple device for opening tin cans, which device can be used as a cover for the opened cans. The invention consists in a circular plate of metal provided with a flange, and with a pointed or sharp edged tooth or stud a short distance back of the edge, and projecting in the same direction as the flange, and with a handle on the opposite surface, which plate is pressed upon the head of the can, so that the stud will pass through the head, when the plate is turned by means of its handle, causing the sharp stud to make a circular cut in the head of the can.

Alizarine Turkey Red.—Mr. Armand Muller Jacobs, of Moscow, Russia, has patented a process of preparing a mordant for use with alizarine in dyeing in turkey red colour, which consists, first, in uniting about two hundred and twenty parts of oil or fat and fifty parts of sulphuric acid, the mixture being stirred for about three hours until a temperature of 30° to 45°. Reaumur is reached, and then left at rest for about twelve hours; secondly, adding to this mixture a watery solution of crystallized soda, and allowing the whole to stand about twenty-four hours; thirdly, drawing off the neutralized oil and adding about twenty-six parts of aqua ammonia.

An improved *temporary binder* has been patented by Mr. George H. Reynolds, of New York City. The invention consists in combining with a book cover a stiffener having strips, flanged plates apertured and attached to covers at each end, metallic strips that are passed into the folds of the papers, and a slotted studded tube carrying a spring catch.

An improved *millstone face* has been patented by Mr. George A. Coles, of Middletown, Conn. The object of the invention is to save middlings by preventing the granules formed in the furrows from being crushed or pulverised by the lands as the middlings make their way toward the skirts of the stones. The invention consists in connecting the main furrows of a millstone by channels made at right angles to a given radius of the face of the stone, and being limited in extent by the furrows and distributed over the working surface of the stone from the bosom to the skirt.

An improved *dish cleaner and drainer* has been patented by Mr. Samuel B. Luckett, of Knightstown, Ind. The invention consists in constructing a dish washing and drying apparatus, with a base frame, posts, and a top frame having dish receiving notches, a pan to receive the drip water, longitudinal bars for supporting cups while drying, a hinged angular plate or apron for supporting dishes while being washed, and a perforated pan for supporting knives and forks while drying.

An improved *rein holder* has been patented by Mr. Edward C. Clarke, of Circleville, Ohio. This is a device to be attached to the dashboard, seat, or other part of a carriage or other conveyance for holding the reins.

Water Gate.—Mr. John S. Powers, of New Burlington, Ind., has patented an improved water gate, consisting of a base frame secured to the bottom of the stream, an inclined frame hinged at its upper stream end to the base frame, and supported at its down stream end by hinged standards having a crossbar attached to their upper ends, and wheels pivoted to their lower ends, and the stops attached to the base frame for the wheels of the supporting standards to rest against, so that the passage of animals will be prevented and the gate will be lowered to the bottom of the stream by a rise of water or an accumulation of rubbish.

An improved *horse collar fastening* has been patented by Mr. Samuel Peters, of Sydney, Nova Scotia, Canada. The object of this invention is to provide the extremities of the horse collar with a fastening whereby the collar can be conveniently opened and closed, and thereby readily adjusted to or removed from the neck of the animal.

An improved *store counter seat* has been patented by Mr. Willis M. Corwin, of Glen Cove, N.Y. The invention consists in a store counter seat in which a bar carrying the seat is provided with a catch recess, a hinged bar pressed forward by a spring to carry the seat beneath the counter, a catch bar to engage with the recess of the seat bar to hold the seat in place when under pressure, and a spring to raise the seat bar from the catch plate when the pressure upon the seat is removed, so that the seat, when released from pressure, will be carried in under the counter automatically.

Steam Auger.—Mr. William F. Leach, of St. Clair, Mich., has patented a portable steam auger having a rotary steam engine to operate the boring tool, handles for carrying and holding the engine, a breastplate for forcing the boring tool forward to its work, and a tool holder or coupling for connecting a boring tool with the engine.

A nail-holding and starting attachment for hammers has been patented by Mr. George C. Peeling, of Lock Haven, Pa. The object of this invention is to facilitate the driving of nails in places where they cannot be conveniently held by the hand.

An Improvement in Propellers.—Mr. Robert Gawne, of Toledo, O., has patented an improvement in propellers. A hollow cylinder is fitted in the vessel at the stern and extends through the stern post below the water line. A cylinder extends from the stern of the vessel to near the engine, its diameter being proportioned to the extent of rise and fall it is desired to obtain for the propeller. The propeller shaft is placed in line with the central axis of the cylinder, and carries a pinion that meshes with a gear wheel on the engine shaft. The pinion will thus be always engaged in any position to which the cylinder may be turned. By a semi-rotation of the cylinder the propeller is shifted from the highest to the lowest point, and can be thus positioned according to the load or the depth of the water. With a light load the propeller can be brought down into the water to obtain effective action, and with a deep-loaded boat the propeller can be raised in shallow water, as may be necessary.

An improved *sand and water break* has been patented by Messrs. Charles W. Maxson, of Point Pleasant, and Jacob W. Buck, of Freehold, N. J. The object of this invention is to prevent the bluffs or banks of a sea beach from being washed away by the waves or covered with sand.

An improved *fish and game trap* has been patented by Messrs. Gottlieb Rentz and Frank H. Herzog, of Quincy, Ill. This invention consists in a wire with hooks at the ends, and a spring coil in the middle, forming two shanks, which are provided with short bends to receive the end of a spring trigger when the two shanks are crossed. When the animal bites or nibbles at the bait the spring trigger snaps upward, thus releasing the spring shanks which are forced apart in the mouth of the animal.

An improvement in *bottle washers* has been patented by Mr. Lawrence Wagner, of Jefferson City, Mo. The object of this invention is to provide a safe, speedy, and simple method of cleaning bottles.

An improved *hay rake* of the class in which the rake proper is attached to and supported by a wheeled frame, with handles for propelling it, has been patented by Mr. George H. Preston, of Ottawa, Ontario, Canada. The improvement consists in attaching the rake proper to the rear portion of the frame or handles, in rear of a transporting wheel, by means of braces that are pivoted to the frame, and chains which may be adjusted in length as required to adapt the implement for convenient use by persons of different height.

The Scientific Review

AND

SCIENTIFIC AND LITERARY REVIEW,

A RECORD OF PROGRESS IN

ARTS, INDUSTRY, AND MANUFACTURES,

INCORPORATING THE

JOURNAL OF THE INVENTORS' INSTITUTE,

(*Established* 1865.)

Is published in the first week of every month at the

OFFICES, 21, COCKSPUR STREET, CHARING CROSS,
LONDON, S.W.

The Scientific Review will be sent post free on prepayment of the Annual Subscription of 6s. 6d.; or it may be had wholesale from Messrs. KENT and CO., Paternoster Row, or through any Bookseller or Newsagent in the kingdom, price 6d. per copy. Single copy post free from the office, 6½d.

The Scientific Review, having an old-established circulation, and being well read by Manufacturers, Capitalists, and others interested in inventions and enterprises for the promotion of industry, will be found a desirable medium to many Advertisers.

All Communications for Publication, Books for Review, and letters respecting Advertisements, Subscriptions, &c.—be forwarded to the

Editor: 21, Cockspur Street, Charing Cross, S.W.

And if for notice in the next issue, before the 25th instant.

THE INVENTOR'S INSTITUTE,

4, ST. MARTIN'S PLACE, TRAFALGAR SQUARE. LONDON.

Established 1st May, 1862.

Past Presidents:

Sir David Brewster, K.H., LL.D., F.R.S., &c., from the establishment of the Inventors' Institute, till his decease, February, 1868. Lord Richard Grosvenor, M.P.

President, SIR ANTONIO BRADY.

Subscriptions are payable to Mr. G. A. Stretton, the Receiver, 4, St. Martin's-place, S.W., who is the proper official to give receipts.

F. W. Campin, Sec.

SESSION 1880—1881.

The Session of the Inventors' Institute will commence on the 24th inst. with the Annual Inventors' Dinner, which will take place at St. James's Hall that evening at 6.30 p.m. Gentlemen who desire to attend the dinner will please apply for tickets to the Hon. Secretaries of Dinner Committee, Scientific Review Office, 21, Cockspur Street, Charing Cross, S.W.

Monthly Notices.

Mr. Robert Etheridge, F.R.S., who has for many years most ably filled the post of Palæontologist to the Geological Survey of the United Kingdom, has been appointed Assistant-Keeper of the Geological Department at the British Museum of Natural History, South Kensington. We doubt not that the important work now being carried on by Dr. Henry Woodward, F.R.S., will be ably continued by Mr. Etheridge.—*Atheneum.*

Oxyhydrogen Gas Lighting.—Prof. Blyth, in his lectures at Anderson's College, Glasgow, strongly solicits attention to the very beautiful method of lighting by oxyhydrogen gas. He states that he sees no difficulty in obtaining by many sources of power these gases, separately or combined, storing them as coal gas is stored, and distributing them in the same manner. His rough calculations led the professor to believe that by using wind or water power to produce the gases their use would be economical.

New Fuel and Stoves.—Herr Nieske describes in the *Deutsche Ind. Zeitung* a new method of heating by mixing hyposulphate and acetate of soda. One volume of the latter and ten volumes of the former are placed in an inner cylinder hermetically closed, which is adjusted in an outer cylinder pierced with numerous small holes and filled with water. The heat given out by this arrangement will last from ten to fifteen hours, and the constant evaporation of the water yields a wholesome moisture. Ederstein Brothers, of Dresden, are manufacturers of these stoves.

The City and Guilds of London Institute for the Advancement of Technical Education have issued their programme of the tecnological examinations for 1881-2. It gives a list of thirty-two subjects and of the examiners for each subject, with a carefully prepared syllabus of the subjects of examination.

Prof. Scheibler, of Berlin, we read from the *Athenæum*, has proved that strontium is the most powerful medium of extraction in sugar refinery, owing to its capacity of combining with three parts of saccharate. Native strontiante—containing from 93 to 95 per cent. of pure carbonate of strontian—is now largely employed in the sugar refineries. This was obtained only with difficulty, but recently in Westphalia it has been worked to a great depth in mines, and a supply of many thousand tons per annum appears to have been secured.

The Late Mr. H. J. Adams.—We regret to announce the death of Mr. H. J. Adams, senior partner in the house of Adams and Sons, who have been the publishers of Bradshaw's Guides from the time that they first began to appear. Mr. Adams was much respected by all who knew him, but few imagined that the modest, retiring publisher of railway guides was a diligent student of Schopenhauer, and that when he left Fleet Street his evenings were devoted to the study of German philosophy. Mr. Adams never wrote even a pamphlet, and, like too many other English students, he has left behind him no monument of lifelong labours. He died on Monday, Oct. 31, at his house in West Hampstead, at the early age of fifty.

Libarianship of the Bodleian Library.—More than a dozen canditates are at present in the field for the vacant librarianship of the Bodleian Library. Amongst these we may mention the following as the more important: The Rev. C. H. O. Daniel, Worcester College, Oxford; the Rev. E. Ffoulkes, Vicar of St. Mary's Oxford; the Rev. E. Hatch, Vice-Principal of St. Mary's Hall, Oxford; the Rev. W. D. Macray, of the Bodleian Library; Mr. Neubauer, Senior Sub-Librarian of the Bodleian Library; Mr. Nicholson, of the London Institution; Prof. A. H. Sayce, Oxford; and Mr. Scott, Assistant Keeper in the MS. Department of the British Museum. Mr. Bywater, of Exeter College, has withdrawn his name. Prof. Max Muller, who has been elected a curator of the Bodleian, declined to be a candidate. The competition is open till the 20th of the month. The day when the election will take place is not yet fixed.—*Athenæum.*

The Methanometer.—D. Monnier.—This instrument is an automatic indicator of the presence of "fire-damp." This gas, in contact with an excess of air and under the influence of the induction-spark or a red-hot platium wire, is decomposed into napthalin, carbonic acid, and water. From this decomposition there results a depression which is transmitted in Monnier's apparatus to a manometer, the mercury of which on reaching a certain level sets up an electric current.

THE SCIENTIFIC REVIEW
AND
Scientific and Literary Review
INCORPORATING THE "JOURNAL OF THE INVENTORS' INSTITUTE."

NOVEMBER, 1881.

PATENT LAW AMENDMENT ACT.

It being evident from the public movements now at work in behalf of Patent Law Amendment, that something practical will take place in the next Session of Parliament we deem it right to place before our readers all information that may appear to be useful; hence we now reproduce the Invention Right Bill, which was drawn up by the Inventors' Institute years ago, and elicited much approval from the late Lord Chief Justice Bovill, Dr. C. W. Siemens, R. Richardson, Esq., Messrs. Barlow, C.E., Lord Justice Selwyn, and a number of Inventors, including many of eminence. It has since that time been reconsidered again and again by the Inventors' Institute, and except that Messrs. Anderson, Palmer, Brown, and Broadhurst's Bill is much lower as to Stamp Duties, has been generally assented to.

The schedule of fees of Mr. Anderson's Bill has been considered and re-considered at various meetings, and generally approved of. Therefore we put it forward instead of the schedule of fees attached to this Invention Right Bill, which was somewhat higher.

Schedule of Stamp Duties.

	£	s.	d.
On Petition for grant of Letters Patent	0	10	0
On certificate of record of notice to proceed	0	10	0
On warrant of Law Officer for Letters Patent	1	0	0
On the sealing of Letters Patent	1	0	0
On the Specification	1	0	0
On Letters Patent at the end of seven years	20	0	0
On Letters Patent at the end of twelve years ..	40	0	0
On Letters Patent at the end of seventeen years ..	40	0	0
On certificate of record of notice of objections ..	1	0	0
On certificate of every search and inspection	0	1	0
On certificate of entry of assignment or license ..	0	5	0
On certificate of assignment or license	0	5	0
On application for disclaimer	1	0	0
On caveat against disclaimer	1	0	0
On office copies of documents for every 90 words ..	0	0	2

On every addition to a patent one-half of the above stamp duties.

THE ACT PROPOSED BY THE INVENTORS' INSTITUTE FOR REGULATING PROPERTY IN INVENTIONS.

WHEREAS it is just and expedient to enact laws for regulating property in inventions, Be it enacted by the Queen's Most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal and Commons in this present Parliament assembled, and by the authority of the same, as follows:—

I.—It shall be lawful for Her Majesty, from time to time, by Warrant under Her Royal Sign Manual, to appoint a fit and proper person, being a barrister-at-law, to be Chief Commissioner of Invention-rights, also six Assistant Commissioners, each of whom shall be conversant with one or more branches of practical science and manufacture, and a person or persons as Registrar or Registrars, to fulfil such duties as may be appointed to be fulfilled by him or them, by the rules and regulations of the Chief Commissioner: and all the above-mentioned persons shall receive as remuneration for their services the annual sum set forth in Schedule — to this Act annexed.

II.—That the Chief Commissioner shall, for the purposes of this Act, have and possess all the authority, rights, and powers appertaining or belonging to a judge of Her Majesty's Superior Courts of Common Law at Westminster, or at Dublin, or the Supreme Court at Edinburgh, or of Her Majesty's Court of Equity [Note.—This Bill was drafted some years before the present Supreme Court of Justice was established, hence the term in the Act is used], and may compel the attendance of witnesses, the production of documents, books, and papers, and make such orders, and do such other matters and things as may now be done by any of the judges as aforesaid. And whereas the said Chief Commissioner shall hold a court under this Act, which court shall have all the authority and power of a superior court of common law and of equity, and the orders, judgments, and decrees of such court may be enforced and carried into effect in the same way that the judgments, orders, and decrees of the said superior courts of law or equity are executed or carried into effect, and such court shall be the only court for the trial and decision of all cases, questions, matters, and things relating to the validity or infringement of Invention-rights. But such court shall, nevertheless, be subject to such rules and regulations as the Chief Commissioner may make, or as hereinbefore provided.

III.—The Commissioners of Patents for Inventions, appointed under the "Patent Law Amendment Act, 1852," shall from and after ——— date cease to exercise the powers vested in them by the said Act: and the Chief Commissioner of Invention-rights shall exercise such of those powers as are not otherwise hereinafter provided for in, and are not inconsistent with, this Act.

IV.—It shall be lawful for the Commissioners of Her Majesty's Treasury from time to time to provide and appoint proper places and buildings for an office or offices for the purposes of this Act.

V.—It shall be lawful for the Chief Commissioner, with the consent of the Commissioners of the Treasury, from time to time to appoint, for the purposes of this Act, such clerks and officers as he may think proper. And it shall be lawful for the Chief Commissioner from time to time to remove any of the clerks and officers so appointed, with the consent of the Commissioners of the Treasury, the case having first been duly reported on to them.

VI.—It shall be lawful for the Commissioners of Her Majesty's Treasury from time to time to allow the necessary sums for providing offices under this Act, and for the fees, salaries, or payments made to the commissioners, clerks, officers, and others, and for defraying the current and incidental expense of such offices and persons; and the sums to be so allowed shall be paid out of such moneys as may be provided by Parliament for that purpose.

VII.—It shall be lawful for the Chief Commissioner from time to time to make rules and regulations, not inconsistent with the provisions of this Act, respecting any and all matters and things which, under the provisions herein contained, are to be under his control and direction. And all such rules and regulations shall be laid before both Houses of Parliament within fourteen days after the meeting thereof, if Parliament be sitting, and if Parliament be not sitting, then within fourteen days after the next meeting of Parliament; and the Chief Commissioner shall cause a report to be laid annually before Parliament of all the proceedings under and in pursuance of this Act. Provided that no such rules as are herein-before mentioned shall come into operation until fourteen days after they have been laid before Parliament.

VIII.—It shall be lawful for the Chief Commissioner, for the purposes of this Act, to cause to be made a seal (hereinafter termed his official seal), and from time to time to vary such seal, and to cause to be impressed therewith all instruments, documents, and copies proceeding from the office of the Commissioners; and all courts, judges, and other persons whosoever shall take notice of such seal, and receive impressions thereof in evidence, in like manner as impressions of the Great Seal are received in evidence, without further proof or production of the originals.

IX.—Subject to the conditions hereinafter mentioned, the Chief Commissioner shall issue certificates of Invention-right, which shall confer on the registered proprietors of such certificates all the powers, rights, and privileges hitherto conferred by letters patent for inventions, throughout the whole of the United Kingdom of Great Britain and Ireland, the Channel Islands, and the Isle of Man, and subject to the conditions hereinafter mentioned. Such Invention-rights shall continue in force for a term of twenty-one years from the date of application.

X.—Any inventor who desires to have his invention publicly recorded, without retaining the privileges of Invention-right, shall be at liberty to make application, in the manner provided in Schedule — to this Act annexed; and he shall lodge the declarations and specifications, free of any charge for stamp duty or otherwise, and provided such invention be new, it shall henceforth be the property of the public.

XI.—Upon making application for a certificate of Invention right there shall be deposited at the office of the Commissioners a declaration in the form set forth in Schedule — to this Act annexed. And there shall shall be left therewith a descriptive statement of the invention (hereinafter termed a specification); and an acknowledgment thereof in writing shall be given to the applicant or his agent. And all such applications shall be recorded and preserved in such manner as the Chief Commisioner may direct, and a registry thereof, and of all proceedings thereon, shall be kept at the office of the Commissioners.

XII.—The invention described in any application for a certificate of Invention-right may, during the term of six months from the date thereof, be used and published without prejudice to the validity of any certificate of Invention-right to be afterwards issued for the said invention.

XIII.—At any time during the first four months after the date of application for Invention-right, any applicant for certificate of invention may, on payment of the fee set forth in Schedule —, alter or amend the specification of his invention; provided such alterations or amendments are allowed by the Chief Commissioner, in case of appeal made to him: being found consistent with the original application, and not inconsistent with the Invention-rights of any other person or persons, and being allowed by the Assistant Commissioners, to whom the application shall, as hereinafter provided, be referred; and the description so altered or amended, or, failing any such alterations or amendments, the description contained in the original specification, shall be held to be the complete specification of the invention for which certificate of Invention-right is sought.

XIV.—In case of any application for certificate of Invention-right, and the obtaining ofthe same, in fraud of the true and first inventors, by reason of the deposit of a specification or otherwise, any certificate issued to the true and first inventor shall not be invalidated by reason of such application or of such certificate, or of any use or publication of the invention subsequent to such application, and before the issue of the certificate of Invention-right to the true and first inventor.

XV.—The Chief Commissioner shall cause all applications for certificate of Invention-right, as soon as recorded) to be advertised in such manner as the said Chief Commissioner shall see fit.

XVI.—At any time after the deposit of the specification of any invention, but not later than four months after the date of the application for certificate of Invention-right in the same, the applicant may give notice at the office of the Commissioners of his intention to proceed with his application; and thereupon the Chief Commissioner shall cause his said application to be advertised in such manner as he shall see fit; and any person having an interest in opposing the issue of the certificate of Invention-right shall be at liberty to leave particulars in writing of their objections to such application at the office of the Commissioners within twenty-one days, subject to such regulations as the Chief Commissioner may direct.

XVII.—So soon as the time for the delivery of the objections before mentioned shall have expired, the application, specification, and particulars of objection (if any) shall be referred by the Chief Commissioner to such of the Assistant Commissioners as are conversant with the subject matter of the invention; and thereupon the said Assistant Commissioners shall examine the correctness of the title and the sufficiency of the specification as completely and particularly describing and ascertaining the nature of the said invention, and in what manner the same is to be performed; and they shall also institute an investigation into the novelty of the said invention, and if they arrive at the conclusion that the said invention, either altogether or in part, is not new, then their opinions, with suggestions for any amendment in the title or specification, shall be forthwith transmitted to the applicant or his agent, in order that the required amendments may be made, or that the Assistant Commissioners may be satisfied that they are not necessary; and also the said Assistant Commissioners shall receive such evidence as may be offered in favour of and against the objections (if any), and shall report the same, and their opinions thereon, to the Chief Commissioner.

XVIII.—The investigations by the Assistant Commissioners shall proceed upon an examination of the specifications and comparison of the same with a descriptive statement in writing of the particulars of the alleged objection, which shall be filed at the Commissioners' office by every person objecting to the issue of any certificate of Invention-right, such last-mentioned descriptive statement to be verified by a declaration in the form set forth in Schedule — to this Act annexed. And such Assistant Commissioners shall not receive *viva voce* statements or evidence unless they require any person or persons to make any explanation of what has been already laid before them in writing.

XIX.—The Chief Commissioner, after receiving the Assistant Commissioners' reports, shall, if required, investigate all matters connected with such applications for Certificates of Invention-right, whether the same have been investigated by the said Assistant Commissioners or not (save and except questions as to the merit or utility of the alleged invention); and he shall, if he deem it proper so to do, or if it be required by any of the parties before him, hear *viva voce* the Assistant Commissioners in support of their report, and also the person or persons objecting to the same, and likewise any evidence that such person or persons may bring before him; and, further, he may, if he deem it proper so to do, permit counsel, attorneys, or agents to address him on behalf of any such person or persons. Provided always, that the costs attending the employment of such counsel, attorneys, or agents shall not be allowed against the unsuccessful party or parties, unless the Chief Commissioner certify in favour of the allowance of such costs and their maximum amount; and the Chief Commissioner, after having duly heard and investigated the case, shall decide as he may deem just and right. Provided always that in any case no costs be entailed on the Assistant Commissioners.

XX.—If the applicant for a Certificate of Invention-right, notwithstanding objections on the part of the Assistant Commissioners to whom the application is referred, should persist in demanding such certificate, he shall receive the same, but at his own risk and peril, and the opinions of the Assistant Commissioners shall, if sanctioned by the Chief Commissioner, be recorded with the specification, and upon the certificate; but in cases where objections are raised by any persons other than the Assistant Commissioners, no Certificate of Invention-right shall be issued should such objection (after hearing the parties, as hereinbefore enacted) be deemed conclusive by the Chief Commissioner. (Vide provision as to appeal, Clause XLIX.)

XXI.—It shall be lawful, at any time after the issue of a Certificate of Invention-right, and before the same is confirmed, for any person or persons to file in the office of the Commissioners a requisition, in the form given in Schedule — to this Act annexed, that an inquiry into, and adjudication upon, the validity of such certificate shall be made by the Chief Commissioner, who shall proceed in the matter of such inquiry, in the form and manner (or as near thereto as circumstances may permit) as hereinbefore provided in the case of hearings and inquiries made by the said Chief Commissioner, previous to the issue of such certificate.

XXII.—No Invention-right, or Certificate of Invention-right, shall be deemed or taken to be invalid, or be subject to be impeached or called in question, on the ground of the insufficiency of the subject-matter thereof, as not being fit and proper subject-matter for the same, or as not being a new manufacture or new invention, when it can be proved that, by the practical use and adoption of what is comprised in and compassed by such subject-matter, a better or cheaper article of manufacture can be produced, or that the production or manufacture of such article may be thereby effected in a better or cheaper manner than was the case before the date of application for the Certificate of Invention-right for the same.

XXIII.—In adjudicating upon the validity of a Certificate of Invention-right, as hereinbefore provided, the Chief Commissioner shall, if he deem it just and right, order the same to be cancelled, and it shall be forthwith cancelled accordingly; provided always, that any person deeming himself aggrieved by the decision of the Chief Commissioner, may appeal to the House of Lords, as hereinafter provided.

XXIV.—It shall be lawful for the Chief Commissioner, by certificate under his hand, to order by or to whom the costs of any hearing or inquiry upon any objection or otherwise, under the preceding or any other section of this Act, shall be paid, and in what manner and by whom such costs are to be ascertained; and if any costs so ordered to be paid be not paid within four days after the amount thereof shall be so ascertained, it shall be lawful for the Chief Commissioner to make an order for the payment of the same; and every such order may be made a rule of one of Her Majesty's superior Courts at Westminster or Dublin, and may be recorded in the books of Council and Session in Scotland, to the effect that execution may pass thereupon in common form.

XXV.—It shall be lawful for the proprietor of an Invention-right, for which a Certificate of Invention-right shall have been duly issued under this Act, at any time during the continuance thereof to surrender the same for the benefit of the public; and thereupon all his rights, powers, and privileges in the same shall cease and determine.

XXVI.—The Chief Commissioner shall cause to be printed, published, and kept for sale at such prices, and in such manner as he may think fit, all specifications of inventions for which Certificates of Invention-right have been issued, as soon as conveniently may be after the issue of such certificates, along with the alterations or amendments of the same: also, abridgments of the same. And it shall be lawful for the Chief Commissioner to present copies of all such publications to such public libraries and museums as he may think fit. And the copies so printed shall be admissible in evidence, and deemed and taken to be *primâ facie* evidence of the existence and contents of the documents to which they purport to relate, in all courts and in all proceedings relating to Invention-rights.

XXVII.—The Chief Commissioner shall cause indexes to all applications for Certificates of Invention-right, and also indexes to patents for inventions granted previously to the passing of this Act, to be prepared in such form as he may think fit; and such indexes shall be open to the inspection of the public, at the office of the Commissioners, and at such other places, and subject to such regulations as the Chief Commissioner shall appoint. And the Chief Commissioner shall cause such indexes to be printed, published, and kept for sale, in such manner and at such prices as he may think fit.

XXVIII.—There shall be kept at the office of the Commissioners under this Act a book or books, to be called "The Register of Invention-rights," wherein shall be registered and recorded, in chronological order, all Certificates of Invention-right issued under this Act, with their specifications and the alterations or amendments of the same, the expiry, vacating, or cancelling of the same, with the dates thereof respectively, and all other matters and things affecting the validity of such Certificates of Invention-right as the Chief Commissioner may direct. And such Register, or a copy thereof, shall be open at all convenient times to the inspection of the public, subject to such regulations as the Chief Commissioner may make.

XXIX.—There shall be kept at the office of the Commissioners under this Act a book or books, entitled "The Register of Proprietors," wherein shall be entered, in such manner as the Chief Commissioner shall direct, the assignment of any Invention-right, or of any share or interest therein, any licence under the same, and the district to which such licence relates, and the name or names of any person or persons having any share or interest in such Invention-right or Licence, the date of his or their acquiring such Invention-right, share, and interest, and any other matter or thing relating to or affecting the proprietorship in such Invention-right or Licence; and a copy of any entry in such book, certified under the official seal of the Chief Commissioner, shall be given to any person requiring the same, on payment of the fees hereinafter provided; and such copies so certified shall be received in evidence in all courts and in all proceedings, and shall be *primâ facie* proof of the assignment of such Invention-right, or share or interest therein, or of the licence or proprietorship, as therein expressed. Provided always that until such entry shall have been made, the applicant or applicants to whom Certificate of Invention-right was issued shall be deemed and taken to be the sole and exclusive proprietor or proprietors of such Invention-right and all the licences and privileges thereby given and conferred; that certified duplicates of all entries made in the said Register of Proprietors shall forthwith be transmitted to the office of the Commissioners in Edinburgh and Dublin, where the same shall also be open to the inspection of the public, and any proceeding to cancel or repeal such Certificate of Invention-right may, for service, be issued to the sheriff of the county or counties in which the registered proprietor of the Certificate of Invention-right for the time being resides; and in case such registered proprietor of the Certificate of Invention-right for the time being do not reside in the United Kingdom, or his residence is unknown, it shall be sufficient to register such proceedings in the office of the Commissioners, and serve notice thereof in writing at the last known residence or place of business of such registered proprietor of the Certificate of Invention-right for the time being; and such register or copy shall be open to the inspection of the public at the office of the Commissioners, subject to such regulations as the Chief Commissioner may make.

XXX.—And it be enacted, in order to give certainty to the title to the property in Invention-right and Certificate of Invention, right issued under and by virtue of this Act that, after an action or proceeding for infringement of any Invention-right, in which the validity thereof shall be brought in question, the registered proprietor of the Certificate of Invention-right may lodge at the office of the Commissioners a requisition to have his right and title to the Invention-right confirmed within the period of one year from the date of the lodgment of such requisition; and the Chief Commissioner shall thereupon cause such requisition to be advertised three times at least at several different periods of three months, and any person having an interest in opposing such confirmation of title shall be at liberty to leave, at the office of the Commissioners, particulars in writing of their objections to such confirmation of title within one month after the date of the publication of the last advertisement of the requisition aforesaid.

XXXI.—So soon as the time for the delivery of such objections shall have expired, the Chief Commissioner shall, along with two of the Assistant Commissioners conversant with the subject-matter of invention for which confirmation of Invention-right is required, hold a Court of Inquiry, and hear such evidence as may be offered on the part of those who object, as well as on the part of the alleged inventors, or the registered proprietors for the time being the Certificate of Invention-right. And after such hearing or inquiry, the Chief Commissioner shall take the opinion of the Assistant Commissioners, and shall decide as to whether the Certificate of Invention-right shall be confirmed or not.

XXXII.—When the Chief Commissioner shall have decided that the title to the Invention-right, and the certificate thereof, shall be confirmed, and shall have issued his order to that effect (which he is hereby authorised and empowered to do), the said title shall thereupon be rendered good, valid, and indefeasible, and the validity thereof shall not be subject to be denied, impeached, or questioned, in any court of law or equity or otherwise, whether on the ground that the registered proprietor of the Invention-right, or the certificate thereof, is not the true and first inventor, or that the subject-matter is not a new manufacture, as to the use and exercise thereof, or on any other grounds whatever; and thereupon the persons named in such order, as registered proprietors of such indefeasible right, shall be absolutely and indefeasibly possessed and entitled to all the rights, privileges, powers, and interests belonging to or accruing under or by virtue of such Invention-right, or the certificate thereof. Provided always, that such registered proprietor may assign or transfer his right, title, and property therein as in this Act provided. Provided always, no register or entry in any books, or record of any indefeasible title, as aforesaid, shall be set aside, or called in question, as to informality in their proceedings in regard thereto, or in the registry or entry thereof.

XXXIII.—Should the Chief Commissioner decide upon confirming the title to any Invention-right, he shall signify such confirmation by a certificate impressed with his seal of office, and deliver the same to the registered proprietor, for the time being, of such Invention-right; and thereafter, subject to the conditions hereinafter named, such certificate shall be valid as a Certificate of Invention-right, to the end of the twenty-first year after the date of the original application; unless the said confirmation be quashed upon appeal to the House of Lords.

XXXIV.—At the end of every third year from the date of any application for Certificate of Invention-right, the fees mentioned in Schedule — to this Act annexed shall be paid, and a receipt for such fees shall be given or endorsed on the certificate.

XXXV.—The fees to be paid, as aforesaid, shall from time to time be paid into the receipt of the Exchequer, and be carried to and made part of the Consolidated Fund of the United Kingdom.

XXXVI.—It shall be lawful for the proprietor of an Invention-right, if he considers that such right has been infringed, to cite the parties whom he may consider guilty of such infringement before the Chief Commissioner; and the Chief Commissioner shall hold courts of inquiry for the trial of such cases, at such times, at such places, and under such regulations he may think fit, subject to the provisoes hereinafter named.

XXXVII.—There shall be kept at the office of the Commissioners a list of engineers, chemists, and other persons conversant with various branches of applied science and manufacture, who are willing to sit as select special jurymen in such cases as may come before the Chief Commissioner, for such remuneration as the Chief Commissioner may allow them; and all cases of alleged infringement shall be tried by the Chief Commissioner, with a jury consisting of five of those persons, unless both parties to any suit shall agree to have it tried with a common jury. And all such suits shall be conducted in other respects as actions at common law are conducted before the judges of any of Her Majesty's superior courts, subject, however, to such regulations as the Chief Commissioner may make as to particulars of breaches and objections and other matters relating to the points in litigation.

XXXVIII.—In any proceeding before the Chief Commissioner it shall be lawful for him, on the requisition of either party, to appoint one of the Assistant Commissioners, or one of the persons named in Section XXXVII. of this Act, to inspect machinery, operations, works, or exhibits. and his order for such inspection shall have the same force as a judge's order; and the Chief Commissioner shall receive the report of said inspector as evidence in the proceeding; and the remuneration to be paid to such inspector shall be such reasonable sum as the Chief Commissioner shall settle and award.

XXXIX.—In any such action for infringement of Invention-right, brought before the confirmation of such right, it shall be lawful for the defendant to impeach or call in question the validity of the Invention-right, for want of novelty, prior use, prior publication, insufficiency of specification, or any other matters for which letters patent may at present be impeached; but after confirmation of title no defendant shall be at liberty to plead other than the general issue of non-infringement.

XL.—It shall be lawful for the proprietor of a Certificate of Invention-right, at any time before the same shall have been confirmed, to lodge at the office of the Commissioners a written statement, disclaiming any portion of the invention which he may have discovered not to be new, and such disclaimer shall be referred to such of the Assistant Commissioners as are conversant with the subject-matter of the invention, who shall report upon the same to the Chief Commissioner; and if he approve of such disclaimer, it shall take effect, and be recorded, printed, published, and held open to public inspection, along with the specification to which it refers. Provided always, that no disclaimer shall be allowed to extend the scope and effect of the Invention-right. Provided also, that no disclaimer entered and allowed by the Chief Commissioner shall be set aside, or decreed invalid, if the Invention-right, after disclaimer, shall leave a residue of subject-matter which is new, useful, and practicable.

XLI.—The several forms in the Schedule to this Act may be used for and in respect of the several matters therein mentioned, and the Chief Commissioner may, where he may think fit, vary such forms as occasion may require, and cause to be printed and circulated such forms as he may think fit to be used for the purposes of this Act.

XLII.—If any person shall deem himself aggrieved by any entry made under colour of this Act in the said Register of Proprietors, it shall be lawful for such person to apply to the Chief Commissioner for an order that such entry may be expunged, vacated, or varied; and upon any such application the Chief Commissioner may make such order for expunging, vacating, or varying such entry, and as to the costs of such application, as he may think fit; and the officer having the care and custody of such register, on the production to him of any such order for expunging, vacating, or varying such entry, shall expunge, vacate, or vary the same according to the requisitions of such order.

XLIII.—If any person shall wilfully make, or cause to be made, any false entry in the said Register of Proprietors, or shall wilfully make or forge, or cause to be made or forged, any writing falsely purporting to be a copy of any entry in the said book, or shall produce or tender, or cause to be produced or tendered in evidence, any such writing, knowing the same to be false or forged, he shall be guilty of a misdemeanour, and shall be punished by fine and imprisonment accordingly.

XLIV.—An account of all salaries, fees, allowances, or other sums to be appointed, allowed, or granted under this Act shall, within fourteen days next after the same shall be so appointed, allowed, or granted respectively, be laid before both Houses of Parliament, if Parliament be then sitting, or if Parliament be not then sitting, then within fourteen days after the next meeting of Parliament.

XLV.—No certificate of Invention-right for any invention shall prevent the use of such invention in, on, or about any foreign ship or vessel which may be in any port of Her Majesty's dominions, or in any of the waters within the jurisdiction of any of Her Majesty's courts, where such invention is not so used for the manufacture of any goods or commodities to be vended within or exported from Her Majesty's dominions. Provided always, that this enactment shall not extend to the ships or vessels of any foreign state of which the laws authorise subjects of such foreign state, having patents or like privileges, for the exclusive use, or exercise of, or property in inventions within its territories, to prevent or interfere with the use of such inventions in British ships or vessels while in the ports of such foreign state or in the waters within the jurisdiction of its courts, where such inventions are not so used for the manufacture of goods or commodities to be vended within or exported from the territories of such foreign state.

XLVI.—When a certificate of Invention-right is issued for or in respect of any invention first invented in any foreign country, or by the subject of any foreign power or state, and a patent, or like privilege, for the exclusive use, or exercise of, or property in such invention in any foreign country is there obtained before the issue of such Certificate of Invention-right in the United Kingdom, all rights, privileges, and advantages under such Certificate of Invention-right shall cease and be void immediately upon the expiration or other determination of the term during which the patent or like privilege obtained in such foreign courts shall continue in force, or where more than one such patent or like privilege is obtained abroad, immediately upon the expiration or determination of the term which shall first expire, or be determined of such patents or like privileges.

XLVII.—In case any applicant for Certificate of Invention-right shall die before the issue of the same, it may be issued to the executors and administrators of such deceased applicant, and shall be of the like force and effect as if it had been issued to such applicant himself. And in the case of a Certificate of Invention-right being applied for by an executor or administrator after the decease of any inventor, such Certificate of Invention-right shall be granted to such executor or administrator, and be as good and valid as if it had been issued to the inventor himself.

XLVIII.—In case any Certificate of Invention-right shall be destroyed or lost, another Certificate of the like tenor and effect, and sealed and dated as of the same day, may be issued, subject to such regulations as the Chief Commissioner may direct.

XLIX.—At any time within three months after a decision has been pronounced by the Chief Commissioner on any of the subjects adjudicated upon by him, either of the parties interested in such decision may appeal therefrom to the House of Lords, if Parliament be then sitting, or if Parliament be not sitting at the end of such three months, then he may appeal at any time within fourteen days after the next meeting of Parliament.

L.—The proprietor of an existing patent for an invention may make application for a Certificate of Invention-right as if for a new invention, and it shall be lawful for the Chief Commissioner to issue a Certificate to him, such certificate to bear the date of the patent, and to be valid under the same conditions as other Certificates of Invention-right issued under this Act. Provided always, that if the stamp duty of —— has been paid on such patent, the triennial fee for the Certificate shall be remitted during twelve years after the payment of such stamp duty; and if the £100 stamp duty has also been paid, all further triennial fees shall be remitted.

LI.—No sum or sums of money paid to the proprietor or proprietors of any Invention-right, for which a Certificate of Invention has been duly issued under this Act, whether such sum or sums of money may have been paid as royalty, premium, consideration money, or otherwise, shall be recoverable at law or in equity. And no suit, action, or procedure shall be maintainable for or in regard thereto, if the said Invention-right is cancelled after such payment has been made.

LII.—It shall be lawful for the Chief Commissioner, in any proceeding before him, on the application of the plaintiff or defendant, respectively, to make such order for an injunction, inspection, or account, and to give such direction respecting such action, injunction, inspection, and account, and the proceedings therein respectively, as he may think fit.

LIII.—In taxing the costs, in any proceeding before the Chief Commissioner, regard shall be had to the particulars delivered in such proceeding, and the plaintiff and defendant respectively shall not be allowed any costs in respect of any particulars, unless certified by the Chief Commissioner to have been proved by such plaintiff and defendant respectively, without regard to the general costs of the cause

LIV.—Whereas divers persons, by virtue of their offices or appointments, are entitled to fees or charges payable in respect of letters patent for inventions, as heretofore granted within the United Kingdom of Great Britain and Ireland, or have and derive in respect of such letters patent, or the procedure for the granting thereof, fees or other emoluments or advantages, it shall be lawful for the Commissioners of the Treasury to grant to any such persons who may sustain any loss of fees, emoluments, or advantages, by reason of the passing of this Act, such compensation as, having regard to the tenure and nature of their respective offices and appointments, such Commissioners deem just and proper to be awarded. And all such compensations shall be paid out of such moneys as may be provided by Parliament for that purpose. Provided always, that in case any person to whom any yearly sum by way of compensation shall be awarded and paid, shall, after the passing of this Act, be appointed to any office or place of emolument under the provisions of this Act, or in the public service, then, and in every such case, the amount of such yearly sum shall in every year be diminished by so much as the emoluments of such persons from such office or place shall amount to, and provisions in that behalf shall be made in the award to him of such yearly sum.

LV.—The expression "Chief Commissioner" shall mean the Chief Commissioner of Invention-right appointed in conformity with this Act, and "Assistant Commissioner" shall mean the Assistant Commissioner appointed in conformity with the said clause. The expressions "Application," "Declaration," "Statement," "Specification," "Certificate of Invention-right," respectively, shall mean instruments in the form and to the effect in the Schedule hereto annexed, subject to such alterations as may from time to time be made therein, under the powers and provisions of this Act.

LVI.—In any such action or proceeding relating to an Invention-right, no objection shall be allowed, nor evidence admissible, as to publication, user, or other circumstance which might affect the validity of such Invention-right, if such publication, user, or other circumstance occurred more than fifty years before the date of the application for the Certificate of such Invention-right.

LVII.—In citing this Act in other Acts of Parliaments, instruments, and proceedings, it shall be sufficient to use the expression, "The Invention-right Act," &c.

LVIII.—This Act shall commence and take effect from ——.

(The Act provides for Salaries, payable per annum—Chief Commissioner, £3000; each Assistant Commissioner, £1000; each Registrar, £500.) Clerks and other officers (see Clause VI).

A Portable Electric Lamp.—Recently while the mechanical section of the British Association were discussing the means of using the electric light in coal mines, Mr. Swan, inventor of the "Swan lamp," made a remarkable statement. He produced an electric lamp of two-candle power, quite detached from any wire, and portable, which could be kept lighted for six hours by a two cell Faure secondary battery. The weight of the battery would not exceed ten pounds, and to charge it afresh it would only be necessary "to place it for a time in connection with the wires of a dynamo near the pit's mouth." The battery and lamp need never leave the pit. Sir J. Hawkshaw greatly approved this lamp, and well he might. The germ of a portable and handy electric lamp, unconnected with any wire, and fed at intervals only as an oil lamp is, must lie in that rude specimen shown.—*Scientific American.*

Lamp Holder.—Mr. John H. Gramps, of Stone Arabia, N.Y., has invented a holder for use with ordinary hand lamps, by which such lamps can be securely held on sewing machines, tables, &c., and at other places where there is liability of the lamps being upset. The invention consists in a combined clamp and adjustable holder adapted for being secured to the edge of a table, and for holding the lamp in any position required.

Proceedings of Societies.

ENTOMOLOGICAL SOCIETY.

Oct. 5.—Mr. H. T. Stainton, President, in the chair.—Mr. R. M'Lachlan exhibited a specimen of *Gastrophysa ruphani*, Fabr., bred from a parthenogenetic ovum.—Mr. T. Wood an abnormal specimen of *Notiophilus bigultatus*, Fabr.,—Mr. R. Meldola, on behalf of Mr. W. J. Argent, some interesting varieties of British Lepidoptera,—Mr. H. B. Pim, a specimen of *Harpalus discoidens*, Fabr.,—Mr. E. A. Fitch, *Lasius mixtus*, Nyl., an ant new to Britain,—and Mr. A. S. Olliff, a specimen of *Papilio Americus* with abnormal neuration.—The Secretary read a letter respecting the ravages of *Lopadhus cocophages*, Newp., on cocoa-nut trees in Fiji, and some further communications from the Colonial Office relative to locusts in Cyprus, &c.—The following papers were read: "Descriptions of some New Coleoptera from the Hawaiian Islands," by Mr. D. Sharp.—"On some New South American Coleoptera of the Family Rutelidæ," by Mr. C. O. Waterhouse, —"Description of the Immature State of a Ceylonese Insect apparently belonging to an Undescribed Genus," by Prof. Westwood,—and "Notes on Hymenoptera, with Descriptions of New Species," by Mr. P. Cameron.

NEW SHAKESPERE.

Oct. 14.—Mr. Furnivall in the chair.—A resolution was passed "That in memory of the late President Garfield's connexion with Hiram College, U.S.A., and with the New Shakspere Society, a set of the Society's publication's be presented to the library of the said college."—The Committee's Report was read, reviewing the Society's eight years' work, and announcing that a *Monthly Abstract* of its proceedings, edited by the Honorary Secretary, would henceforth be posted to all its members.—The paper read was by Mr. J. W. Mills: "I have much to say in behalf of that Falstaff," contending that in this age of fraudulent companies got up by pretentiously pious directors, &c., an age of vice plus hypocrisy, the too much blaming of Falstaff for his vice plus frankness savoured of cant. The paper also urged the plea of gratitude for the inexhaustible laughter that Falstaff had given the world. —In the discussion which followed some of Mr. Mills's views were strongly dissented from by the Chairman, M. J. Darmesteter, Dr. Bayne, Dr. Nicholson, Mr. Spalding, Miss Hickey, and others.

ARISTOTELIAN SOCIETY.

Oct. 10.—Mr. W. R. Dunstan, V.P., in the chair.—The President, Dr. Shadworth H. Hodgson, delivered an address "On the Practical Bearing of Speculative Philosophy." In all systems of philosophy, past and present, the dominant feature has been and is the employment of a combination of the objective and subjective ways of looking at phenomena as the method of inquiry. This reflective or introspective analysis of the facts of consciousness forms the distinguishing characteristic of speculative philosophy, the object of which is to discover by the use of this method a rationale of the universe. Ethic is based upon the facts of human nature, and inasmuch as these facts can only be brought to light and examined by the means of introspective analysis, speculative philosophy furnishes us with the basis of ethic. Ethic and speculative philosophy both deal with the same subject-matter, and are, in reality, two branches of the same pursuit—the practical and speculative branches of philosophy. Turning to some of the truths discovered by speculative philosophy, the distinction first rendered evident by Kant between form and matter of perceptions was noted, time and space being the form of all sensibility, and sensibility in all its kinds the matter of time and space. A further distinction resulted, that of essence and genesis in all perceptions, which, again, excluded the search for causes from philosophy, its special aim being no longer to know the conditions *existendi* of things, but to know their constituent conditions or conditions *essendi*. These results led to the final differentiation of psychology as a science from the main body of philosophy, by its conception of the infinite in time and space, leads up to the idea of a supreme power beyond the visible and material world. Thus speculative philosophy alone furnishes the intellectual or logical basis for religion. The remaining portion of the address was devoted to showing how speculative philosophy furnishes a basis of ethic, the theory of ethic being wholly subjective and philosophical.

Oct. 24.—Mr. S. H. Hodgson, President, in the chair.—The Rev. W. C. Barlow was elected a Vice-President.—A paper "On the Dialectic of Plato," by Mr. J. Fenton, was read and was followed by a discussion.

QUEKETT MICROSCOPICAL SOCIETY.

Oct. 28.—Mr. T. C. White, President, in the chair,—Mr. Epps exhibited and described a solar microscope constructed by Culpepper about 1750,—Mr. J. W. Groves exhibited and explained a further improvement in his freezing microtome, by which it was now adapted to cutting sections of soft substances embedded in wax, &c., the freezing being effected (as described at a former meeting) by the action of ether spray within the body of the apparatus.—Mr. Debey described a new method of obtaining monochromatic light for the examination of delicate objects under high powers. The light, being condensed by a large "bull's-eye," was passed through a slit and refracted by means of a bisulphide of carbon prism, a simple arrangement enabling any desired portion of the spectrum to be thrown upon the stage.—Attention was called by Mr. Ingpen to some new methods of mounting objects in media of high refractive indices, by which means it was not only possible to use the full apertures of the wide-angled oil-immersion objectives, but a great increase in the visibility of many difficult test objects also resulted from their being mounted in substances of greater optical density than ordinary Canada-balsam.

SOCIETY OF BIBLICAL ARCHÆOLOGY.

Nov. 1.—Dr. S. Birch, President, in the chair.—The Rev. H. G. Tomkins read a communication on the campaign of Rameses II., in his fifth year, against Kadesh on the Orontes.—Communications had also been received from Mr. Sayce, on the newly discovered cuneiform inscription on the northern bank of the Dog River, near Beyrut; and from Mr. Theo. G. Pinches, on a small tablet said to have been found in Cappadocia.

HISTORICAL SOCIETY.

Oct. 27.—Council Meeting.—Dr. Zerffi in the chair.—The following were admitted Fellows: Mr. T. Farmer, Rev. D. J. Mackey, Rev. D. Lloyd James, Mr. G. A. Greene, Mr. J. Steele (re-elected), Rev. A. Connell, Mr. E. J. S. Smith, Mr. A. Scott Gatty, Mr. A. Bence Jones, Mr. Sujematz, Hamid Ali Khan, Mr. J. T. Godfrey, and Rev. L. Lewis.

Preserving Wood.—Mr. Bat Smith, of Spanish Camp, Texas, has patented a composition for preserving wood, consisting of coal-tar, crude carbolic acid, and crude pyroligneous acid.

VIKING SHIP DISCOVERED AT SANDEFJORD, NORWAY, IN 1880.

By J. Harris Stone.

The following paper was read at the York meeting of the British Association:—

Instead of an antiquated, rudely-constructed, and roughly-finished vessel, with primitively-drawn lines, this was a smart, trim-looking craft, built on what a sailor would call beautiful lines, and was admirably adapted as well for speed as for general seaworthiness. It was difficult to conceive such a fresh-looking and well-preserved ship being, as it was undoubtedly, about a thousand years old. He feared that the discovery of this ancient galley had not given them any argument in favour of the theory of the growing superiority of mankind in all branches of knowledge and industry. There was no means of knowing whether this ship was or was not concerned in the raids of the Vikings and their followers on our coasts. They plagued Scotland with varying success till 1014, when a treaty was made between Malcolm and King Sweno, of Denmark—the result of the pluck and steady resistance of the Scotch. The name of the Viking owner of this ship was not known. All that could be said was that he lived at some time during the period from the end of the ninth to the middle of the 11th century, and that when he died he was buried in his vessel, which was drawn up on land and had a mound of earth thrown over it, which luckily for posterity consisted of blue clay. The vessel which Frithiof so beautifully apostrophized, and which entered so largely into the Saga associated with his name, was doubtless a galley similar in all respects to this one. The vessel was now at Christiania. It was excavated at Gokstadt, Sandefjord, about half a mile from the present seashore. In this ship the sepulchral chamber, in which the Viking's body had been deposited, was situated amidships. It was tent-like in shape, made of logs placed side by side, leaning and meeting on a ridge pole running parallel with the main axis of the ship. The mound appeared to have been entered, no doubt for the sake of plunder, for none of the Viking's weapons was found, and only a few of his bones were discovered. There were found in the sepulchral chamber the bones and feathers of a peacock, the bones of a little dog, some fish-hooks, and several bronze and lead mountings to belts and harness. Round about the ship were discovered the bones of some nine or ten horses and dogs which had probably been sacrificed at the time of the burial. The vessel was 77ft. 11in. in length between the rabbets at the gunwale, and at the widest part 16ft. 11in. across; from the top of the keel to the gunwale amidships she was 5ft. 9in. deep. She would draw probably not four feet of water, and she had 20 ribs. She was clinker-built—that was, her planks slightly overlapped, like slates on the top of a house. Her lines were calculated for swiftness as well as seaworthiness. The planks and timber of the frame were fastened together with withes of tree-roots; the bent timbers seemed to be naturally grown and not artificially bent. The boards of the sides are of good, sound, well-seasoned and selected oak, about an inch and a half in thickness. They were smoothly planed and firmly riveted together by iron rivets, which had been carefully clinched on either side. There were also a few oaken bolts near the upper part of the sides. He could find no trace of a saw having been used anywhere about the vessel; the edges of the planks were moulded. The mouldings consisted of indented lines running beneath the length of the plants near the lower margins. Bow and stern were of similar shape; they were pointed and must have risen a considerable distance out of the water. The top of each was broken, so that it could not now be determined whether she originally carried a figurehead or not. The keel was deep and made of thick oak beams. He could not see whether any metal keel had been fastened to the bottom. In the Frithi of Saga, however, "the keel of copper" was spoken of, and he presumed that there might have been something similar in this vessel. An iron anchor found with the vessel had so rusted away that it could not be preserved. There was no deck to the galley, and the absence of seats for rowers was notable. The flooring could be lifted to allow of baling out water; the oars were 20 feet long, and the oar-holes, 16 on either side, had slits towards the stern of the vessel to allow the blade to pass through from the inside. The most interesting thing about the ship was the rudder, which was on the starboard side, a foot or two from the stern. Starboard was a corruption of the words steer board, which no doubt owed its origin to the ancient position of the rudder, as in this galley. This rudder resembled a large oar, consisting chiefly of blade with a short handle. It was fixed not to the side of the boat directly, but to the end of a piece of conical wood, which projected about a foot from the vessel. This piece of wood was bored down its length, and no doubt a rope passing through it secured the rudder to the ship's side. The steering was effected by a tiller fixed in a hole at the upper end of the handle portion, and probably also by a rope fastened to the lower end of the blade. It was hoped that the correct shape of this galley, which was photographed, would rapidly circulate among artists, and for ever put an end to the curious drawings and paintings of Viking galleys. The vessel had one mast. In the mound were also found parts of three small oaken boats, in shape generally like the galley itself, a large, well-made solid copper caldron, a few bedsteads like those used in Norway in the present day, some drinking cups and tubs, some wooden and probably ornamental shields, and some pieces of carved and painted wood, the use of which is unknown. A landing plank, carved ornamentally to prevent slipping when walking to and from the vessel, was also found in the mound. In the Bayeux tapestry in Normandy there occurred numerous representations of galleys exceedingly similar to the one now described. This gave to that tapestry additional interest. He urged that this vessel should receive special study from archæologists and students of the Viking period.

Diagrams were shown of the vessel described.

Mr. Haworth, of Eccles, Lancashire, having seen the ship, congratulated the section on the complete description they had received.

Captain Bedford Pim said his mouth watered as the writer of the paper described the excellent lines of the ship. He should like to see such lines in the present day. He had folded a paper in the form ot a model of our steamships of the present day, from which it could be seen that their length was about ten times their beam. (Laughter).

General Pitt Rivers said that there appeared to be a probable means of ascertaining the comparative age of ships by observing the manner in which the planks were held together. In this case the timbers were partly tied and partly bolted with good wood and iron. General Pitt Rivers gave an interesting account of the intrenchments of the Yorkshire Wolds, and of excavations in the earthwork called Danes' Dyke at Flamborough. The conclusion to which the investigations in this district pointed was that, notwithstanding the traditions which connected this place with the Danes and the prevalence of a Danish element in the popution of this part of the country, this ground was the scene of military operations of a much earlier people, who though ruder in their culture, were superior in the art of war.

Mr. Haworth suggested that as "Danes, Dykes" was a clearly inapplicable term, they should now be called "Fox Dykes." (Laughter).

ORIGIN AND USES OF ASPHALTE.

By Leon Malo, C.E.

Bitumen appears in nature as an accidental mineralogical product, under the most diverse and often most inexplicable conditions. It is found sometimes in the native state, sometimes mixed with clays, sometimes as the cement of conglomerates, sometimes impregnating limestones. The last combination produces the mineral commonly called asphalte. When the bitumen contained in any of these substances is chemically isolated, it appears always a nearly identical substance, in composition, consistency, and appearance, except that the empyreumatic odour that characterises it may become alliaceous in volcanic countries. Asphalte is doubtless one of the most considerable and valuable of the forms in which bitumen appears. It is a soft limestone, naturally and closely impregnated with that substance. When a specimen of it is examined under the microscope, each grain of it appears to be immersed in a pellicle of pure bitumen, by which it is cemented to the adjoining particles. It is thus a species of very fine-grained bituminous conglomerate. When a lump of this rock is heated to a temperature rising from 176° to 212°, the pellicle of bitumen melted, the cohesion of the asphalte is destroyed, and it crumbles into dust. If it is taken while it is still hot, or if it is heated again after it has become cool, and strongly compressed, the particles will adhere again, and the stone will recover, after cooling, precisely the consistency and appearance it had originally. The employment of compressed asphalte for pavements is founded on this property.

Asphalte, or bituminous limestone, is generally found in the Jurassic strata, in regular beds of a lenticular shape, which are uniformly cut into by a stream of water. Sometimes the bed is single, at other times it is multiple; there are formations containing seven beds, one above the other, and distinctly separated by strata of white limestone.

Different views prevail respecting the origin of asphalte and the circumstances under which it is formed. Some believe that the bitumen was already in existence when the calcareous formation took place, and that the particles of limestone were deposited in a bituminous sea. Others consider that the bituminous matter is derived from the organic matter associated with the shells that have furnished the carbonate of lime; and other more hazardous hypotheses have been advanced. A careful observation of asphaltic formations has led me to adopt what appears to me to be a more plausible theory.

It is permitted to suppose, from indications furnished by the study of bituminous districts, that in some geological epochs, which have yet been only imperfectly determined, accumulations of organic matter, buried under enormous masses of Jurassic limestone, and heated by the central fire, became vapourized, and in that condition sought a passage through the crust of the earth. In time the crust cracked, and a fissure was formed. The bituminous vapours, compressed by incalculable pressure, forced themselves through the way that was opened to them, and passed by such strata as were too compact to be penetrated; but, when they reached the oolite, they found on either side of the fissure, beds of a limestone soft enough to admit of their impregnating it. As long as the pressure lasted, the bitumen continued to insinuate itself through the pores of the limestone, and to fill its infinitesimal cavities.

Mineral asphalte is relatively a soft stone. It becomes more compact as the temperature diminishes, but yields under the influence of heat to such a degree that an exposure of a few days to the summer sun will sometimes cause it to crumble. This property has induced the application of the compressed material to the making of pavements. Its fitness for this purpose seems to have been suggested by accident. When the mineral was first quarried, the pieces which fell along the road from the wagons carrying it were ground up by the wheels, and were finally compressed again by the continued passage of the wagons over the dust, so far as to form a kind of spontaneous pavement. A Swiss engineer, M. Mérian, acting upon the suggestion of this incident, asphalted a part of the road from Travers to Pontarlier, in a rough way, but with a satisfactory result. In the next year (1850), M. Darcy, inspector-general of bridges and highways, recommended asphalte as a material for pavements in a report to the Minister of Public Works. The first asphaltic pavement was laid in Paris in 1854.

The mineral appears in industry, under a still more useful form than the compressed form, as asphaltic mastic. This is made by throwing the powdered mineral into a bath of seven or eight per cent. of its weight of liquid bitumen, and mixing the whole thoroughly while it is cooked for five or six hours. The substance produced, although chemically the same, except for the difference in the relative proportions of bitumen and limestone, is physically entirely different from asphalte. It cannot be pulverized by heating, but forms a paste in which the two ingredients seem to be perfectly combined, and which may be moulded into desired forms. The manufacture of the mastic has become an important industry. The annual production of the French shops alone must amount to fifteen or twenty thousand tons.

In *La Nature*, of April 9th, Mr. A. Woeikofen, of St. Petersburg, describes the asphaltic beds of Russia, which occur on the grand curve of the Volga, or the arc of Samara, a short distance above the city of Syzran. They are not deposited in the Jurassic formation, as are those in France, Switzerland, and Germany, but in a dolomitic limestone of the lower carboniferous series. The mineral is rich in bitumen, of less fusible quality than the bitumens of France and Switzerland, and has not been produced in the compressed form. It is extensively made into mastic, the fabrication of which already amounts to ten thousand tons a year, and is rapidly increasing.—*La Nature.*

Melting Steel.—On Tuesday, October 11th, the members of the Iron and Steel Institute visited the Telegraph Construction Works of Messrs. Siemens Brothers, at Charlton, on which occasion Dr. Siemens, F.R.S., exhibited his experiment of melting steel by means of the dynamo-electric current, when five pounds of steel were melted in five-and-twenty minutes. The apparatus employed consists of an ordinary crucible of plumbago, or other highly refractory material, placed in a metallic jacket, or outer casing, the intervening space being filled up with pounded charcoal, or other bad conductor of heat. A hole is pierced through the bottom of a crucible for the admission of a rod of iron platinum or dense carbon, and the cover of the crucible is pierced for the reception of the negative electrode, which is suspended at one end of a beam by means of a strip of copper. The other end of the beam is attached to a hollow cylinder of soft iron, free to move vertically within a wire solenoid, one end of which is connected with the positive, and the other with the negative pole, of the electrical arc.